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Established 1914

CHEMICAL INDUSTRIES

Vol. 41 Nov. 1937 No. 5

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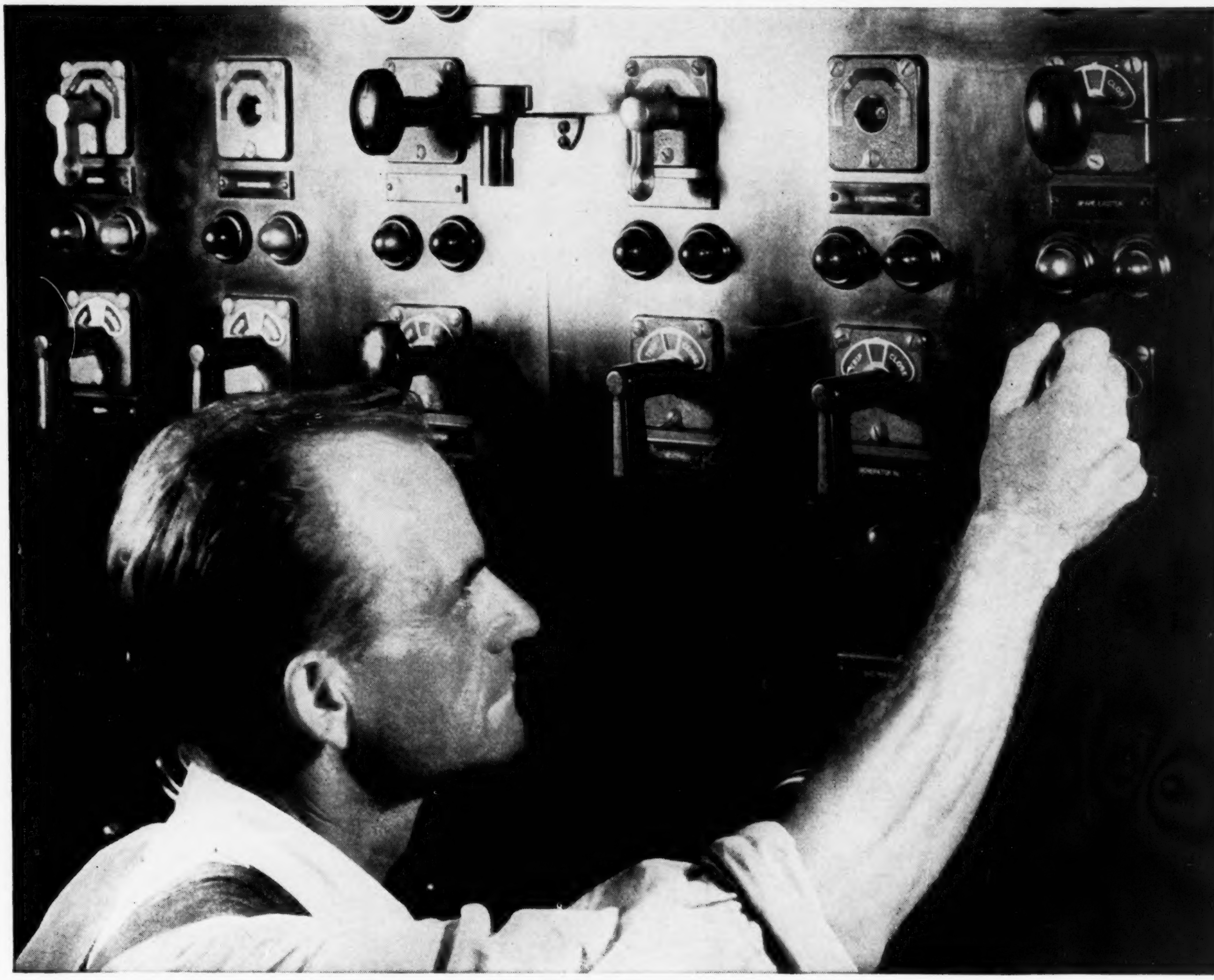


The Reader Writes:—

Filtration Still Necessary

I note the following news item on p. 254 of the September number of CHEMICAL INDUSTRIES.

"A cheap, new way to purify and filter water with bentonite has been revealed by Prof. H. L. Olin, University of Iowa. No filter beds are needed and only 125 parts of bentonite to a million of dirty river water are necessary to cleanse it."

May I correct the statement that no filter beds are needed. The use of bentonite is designed to furnish a floc similar in nature to that produced by alum but superior to it in many respects. Even though it settles readily filtration will in all probability be needed in all cases if only to provide complete sanitary protection.

I am sure that you will be glad to make the correction which will prevent misunderstanding among those interested in water purification.

Iowa City, Iowa — H. L. OLIN
State University of Iowa

From Belgium

We would like to add that we have found your magazine useful and interesting; we always read it with great pleasure. Much can be learned from your technical and commercial articles, and we are often impressed by the soundness and universal character of the views expressed in your editorials.

COMPAGNIE ANVERSOISE
Anvers, Belgium — PRODUITS CHIMIQUES S. A.

The Wisdom of the Serpent?

Please lay off the venomous political editorials.

New York City — J. A. WUNSCH

Unlovely Qualities

I have read with great interest the collection of opinions on "Why Chemists Get Fired," and it seems to me that about all of the serious faults have been fully brought forward. The unhappy part of the situation is the fact that simply "firing a chemist" is expensive and may or may not improve the situation.

It seems inevitable that the four years or more of concentrated academic work in the college atmosphere develops in most students the feeling of superiority toward the everyday facts of common practice. I think this is frequently due to the teaching of some teachers who have this same attitude and who use a few instances of industrial processes which they happen to know about to point out the low mental state of the manufacturers. I think we have all been exposed to these "belittling" illustrations.

I would suggest that it might have a salutary effect to pass on these criticisms to the colleges and give the students an opportunity to learn how they are regarded outside of the university. Practically most of these criticisms point to the desirability of having some teachers who have had industrial experience, both for the leavening effect on the faculty and for the effect on the student. It may be that a course of common sense instruction and economics in these matters could be made part of the curriculum.

Another thing which might be developed in the consciousness of the student is the fact that he has not learned everything when he has finished the course in mathematics or Analytical Chemistry or Organic Chemistry, and so on. Too many chemists cease to be students after they are once graduated. If you talk to any graduate who has not been immediately employed and ask him what reading or study he has undertaken after graduation, the replies will usually be in the negative.

To aggravate matters, we have imposed over all this the effect of the current political ideas regarding the underprivileged, "our rights," the demand for high pay for a few hours work and the psychological effect of the general propaganda that the employer is all wrong, which by inference makes the employee therefore the superior individual.

Many graduates have been exposed to a smattering of "psychoanalysis," and they think they know employers' weaknesses and have learned a "lip service." The recent graduate truly has some unlovely qualities, some of which colleges could correct.

I hope you can start something with the excellent ideas which you have gathered together.

Rochester, N. Y. — SAMUEL J. COHEN

Don't Mention It

Thanks for *not* having published a picture of "Doc" Dorland or "Johnny" Chew for the past three months.

Chicago — M. A. ELLIOTT

A Bad Guesser

If the president of the company I work for was as bad a judge of its financial affairs as the president of the country I live in has proved to be of the national finances, he would have been retired, which would be a nice way for the directors to fire him. January, 1936, President Roosevelt guessed the federal deficit for that year at $1,098,000,000. In September he guessed it would be $2,097,000,000, and in January raised the guess to $2,653,000,000. The actual deficit for 1936 was $2,811,000,000. That is, the final figure was only $1,713,000,000 more than his first guess of $1,098,000,000. He was not even half-way right.

At the same time he was only about three-quarters right on his guess on receipts. It is notable, too, that he has without fail guessed too low on expenditures and too high on receipts.

What a man to set himself up as manager of the financial, industrial, and agricultural activities of the American people! And what a people to let him get away with it!

Philadelphia, Pa. — W. P. DOYLE

We'll Bite—Who?

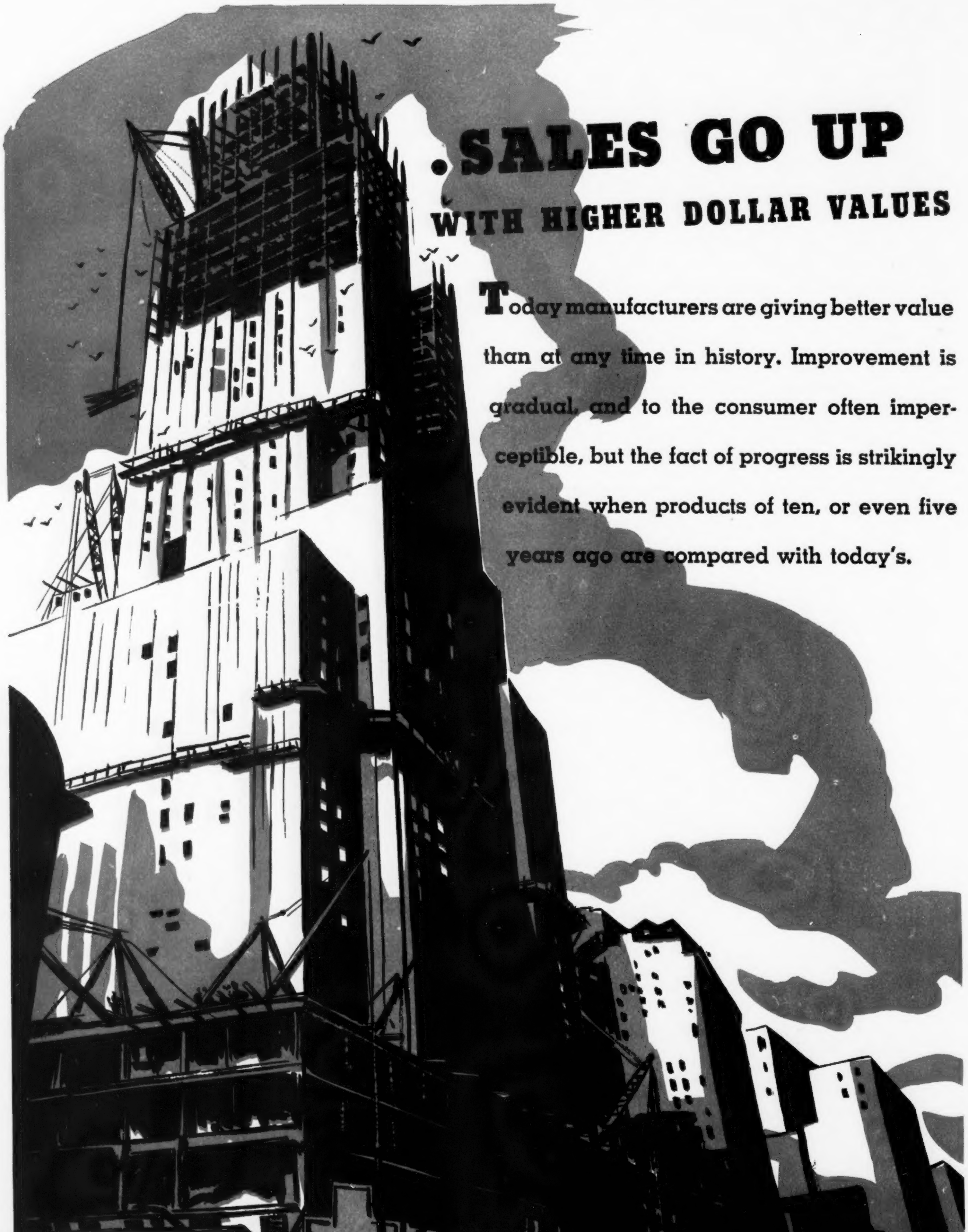
The colleges may not be to blame for the moral and spiritual characteristics of the young graduates they are turning out; but who is to blame for their very sketchy training in chemistry?

Pittsburgh — KINGDON BUTLER

Reprints Will Be Available

About 10,000 copies of those articles "Why Chemists Get Fired" ought to be sent to every chemistry student in every college, university and technical school in the country. No young chemist should miss reading them. Some are better than others, but all are good.

Milwaukee — P. R. BREINIG


SALES GO UP
WITH HIGHER DOLLAR VALUES
Today manufacturers are giving better value than at any time in history. Improvement is gradual, and to the consumer often imperceptible, but the fact of progress is strikingly evident when products of ten, or even five years ago are compared with today's.

CHEMICAL
INDUSTRIES

*The Chemical
Business Magazine*

What Are the Requirements?

If the young technicians entering the industry are not properly trained, it is to a great degree the fault of the industry itself. The best chemical educators are eager to meet the requirements of the industry. Most of their students, as they know well, must seek industrial careers, and most of these teachers are deeply interested in the future of their pupils. Their unselfish devotion to chemical education is plainly read between the lines of the opinions set forth in the symposium published on another page.

Industrialists have criticized in previous issues the lack of thorough, fundamental training in pure chemistry and physics, and the failure to give students a fair and friendly comprehension of applied chemical economics.

Heavy emphasis has been put on so-called practical courses, running all the way from "sewage treatment" to "dairy chemistry"; but we must remember that courses of this type have been offered in response to demands from students and parents for "practical work" and that the industry's insistence upon the "industrial point of view" has ably supported this cry for "shop work" that in chemistry is but an echo of a national confusion of manual training with education.

If, as many industrial leaders point out, chemical training is often faulty because teachers lack sufficient industrial experience, this deficit in the equipment of the educators can only be made good by the industry itself. Such criticism is vacuous, unless greater opportunities for work in our plants and laboratories are open to men from universities, or our practical operating and research executives are sent back to teach. The practical difficulties are many and serious; but if this training problem is worth the pains of solution, some exchange-professor system can be worked out.

The first requirement is obviously that the industry should reasonably determine and clearly state just what training it requires for the laboratory chemist and the research worker, the plant technician and the chemical engineer. Upon these requirements the proper courses of training could be logically built.

Mr. Aldrich Misreads the Business Barometer

So painstaking a study of the slump in security values by so competent an authority as Winthrop W. Aldrich deserves far better attention than it received in Washington; and yet we confess it set forth much too narrowly "the Wall Street view." He weakened his strong case by slighting—even sometimes ignoring—depressing factors outside of the realm of finance.

Business definitely is not so good. The boom of 1936—outside as well as within Wall Street—has petered out. Publicly business men are whistling cheerfully. But privately their fingers are crossed, not because the stock market prophesies another depression, but because it confirms the figures on their own sales ledgers.

The same laws Mr. Aldrich so soundly criticized are having more deadly effects in industry than in Wall Street, and business at large is threatened directly in other ways. Labor not only demands higher wages, but has even been told that higher wages are the only way to prosperity. Greater regulation and more competition from Government are on the "must" program of our openly antagonistic administration. With the relief rolls larger than in 1932 and the budget still unbalanced, incomparably the most serious question before the American people today is whether general business activity will increase or decline. Yet the sole reference to this vital problem in the President's fireside chat was that prosperity depends more on the pricing policy of businessmen than upon any act of the Government. Either he is grossly misinformed as to the true condition of the nation or he was building up in advance an alibi. In either case, had Mr. Aldrich argued from a broader base, his just criticisms would have been more effective.

The Government vs. Prosperity

Though no man can know what course American business activity will take during the next six months, nevertheless it begins to appear that Mr. Roosevelt is in the uncomfortable position of having overstayed the market. Stock quotations, commodity prices, steel orders, a score of favorite indicators, point with notable agreement to an average activity no greater than in 1935. Is this but such a temporary recession as followed the N. R. A. debacle, or will the slump slide on back to the 1932 point?

That is a question that must concern the President as deeply as it does industry, for a return of the depression would seal the doom of the New Deal as surely as it would cause disastrous loss and heart-breaking hardship to the nation. Our recovery has been a pumped-up affair, bloated with inflationary measures and enormous public expenditures. The President has counted heavily on this primed prosperity to solve two of his most embarrassing problems, unemployment and the unbalanced budget; and if the shock of threatened business collapse destroys his happy-go-lucky optimism there is a chance he may begin to realize that only through a sound and healthy business activity can real prosperity come. Already there is talk of "doing something for business."

Business asks no largess, only the confidence bestowed by a fair-minded government that will tax justly, legislate for the whole people, and conduct its own affairs honestly and with reasonable efficiency. This is asking a great deal of the present Administration, and honeyed words are not going to suffice. The present situation is still infinitely more solid than in 1929 and there are powerful forces that will work for recovery. The future can be made bright or dark.

The Patent Contract

In season and out our patent system is the target of adverse criticism that is as inconsistent as it is constant. The patent law, as now adjudicated and administered, is charged at once with being but farcical protection to the patent owner and with being the powerful weapon of monopoly. On the one hand are conservatives who would greatly strengthen the rights of the patentee and his assigns. On the other are radicals who would "nationalize" all patents for the benefit of the people.

A patent is a contract between the people of the United States and the inventor by which, in return for disclosure of his invention, he is given virtually monopolistic rights for a limited time. The theory is that these rights are an incentive to invention, and that the people profit by this stimulation of inventive faculties and by the disclosure which in a few years becomes public property. The record substantiates this theory. But practice has richly encrusted the patent system with scientific, industrial, and legal technicalities. These combine to make its simple and direct enforcement difficult to the benefit of those who would circumvent the law.

Patents are a large and important factor in chemical progress, and the patent law will be up for revision in Congress soon again. It will be helpful to weigh the pros and cons of the discussions that will ensue in the balance of the simple purpose of the law and its plain status as a public contract with the patentee.

How Can the Industry Get and Hold Competent Technicians?

There are two sides to every problem, and if the industrial leaders in plant and laboratory question seriously the training and personality of the younger chemist and chemical engineer, then our leading chemical teachers have their own constructive suggestions as to how the industry itself may help them supply more competent technicians. Below, these suggestions are made—frankly questioning some of the personnel policies of the industry and suggesting ways and means whereby the industry might help the universities, the chemical teachers and their students to assure a larger supply of the type of technicians that they want.

What Does Industry Require?

By H. L. Olin
Professor, Chemical Engineering
State University of Iowa

I am wondering whether plant managers and directors in general have a clear idea of what they want the universities to do in the way of training the men they seek.

Perhaps I should put the question in this way. Are there not as many different demands as there are plants and executives?

I find from my personal experience that personnel men coming here to interview candidates are highly individual, that they have their own ideas which often differ radically from those from other corporations, and that they keep their own counsel. At any rate they give us little help in suggesting types of training or methods of instruction. My answer therefore sums up to this: should not we in academic work receive more direct statements from the employing industries with regard to present demands?

Criticism and Books

By O. R. Sweeney
Head, Chemical Engineering Department
Iowa State College

I frequently find that when a questionnaire is sent out, a man is prone to put something down just to get it off his table. A favorite answer to the college professor is that the boys do not use good English. I have run this old one down repeatedly, and I have found that they do not mean the boys do not use good English but rather that they do not speak logically enough. Accordingly, I am very reticent about questionnaires. The industrialist should keep the matter in mind for a long time and study the shortcomings of the young men as he sees them, cut out all the hobbies and think only of the improvements that should be made in general.

I should say then that the best contribution the industrialist could make to the chemical engineering departments would be a frank letter from time to time telling, in the estimation of the man who is using the product, the modifications that should be made.

In America we get wonderful cooperation from the operating and research men. It is rare indeed that we are refused opportunities to visit chemical plants in Chicago, St. Louis, or any of the other large centers. Almost invariably I get a prompt reply when I ask a question to help with the teaching, but it is a rare thing to have anyone criticize my courses to me. We do a great deal of criticism of our own courses, and at institute meetings we frequently get mad and call each other names, but after all it is the man who uses the product whose criticism should be worth the most.

Large numbers of industrial experts could write monographs to be used as textbooks in their particular subjects. I feel that we should have more such monographs to be used in the classroom.

Today we teach industrial chemistry from books written by some professor in some academy who may or may not be qualified to write a good book in industrial chemistry. If there were a large number of monographs on the different types of chemical industries written by the acknowledged experts in those industries and not in the academies, what a wonderful course we could give, especially if the writers of the monographs were to keep them up to date.

It is true that the industries frequently take away competent men from teaching. I have a feeling that if the colleges and universities were more careful with their funds, they could in turn take from the industries brilliant men and bring them back to the academies. There are vast sums of money spent around colleges for things which could better be spent on salaries.

I might add in this connection that I believe mining

engineering almost has been ruined in most schools by the high salaries paid to competent teachers by large mining companies of a few years ago. Possibly this thing can happen in a few other branches.

Staff and Student

By Walter G. Whitman
Head, Department Chemical Engineering
Massachusetts Institute Technology

Since my personal experience has been as much in industry as in teaching my comments should be interpreted with this in mind.

The problem of teaching staff is paramount and includes both retaining the right men and creating conditions favorable for their further development. Teaching salaries are lower than those which a good man could secure by entering industrial work. I think that this disparity should fairly be expected to continue since there are many non-financial advantages to teaching which will appeal to the man who should be engaged in it. On the other hand, if the discrepancy is too great, most of the better men will be lost to teaching.

Industry can help this situation in a broad way by endowing chairs in chemistry or chemical engineering. A readier method, which possesses more obvious advantages to both sides, is to employ the teachers in industrial consulting work of a type which will help them professionally as well as financially. Our administration, for example, is heartily in favor of a reasonable amount of private consulting work for staff members, believing that the man's teaching and research abilities are strengthened by such activity.

I would not urge that industry refrain from attempted raids on teaching staffs. A system of open competition for men between the university and industry is desirable and the teacher's self-respect and confidence are enhanced by the knowledge that some other organization wants to secure him. Industries' aid should be exercised by helping the school to maintain a fair competitive position.

The second important question is that of securing the right students. A decided majority of our good men come from families in straitened financial circumstances. Industry can help by extending fellowships for graduate work to the most promising of these men. Equally important assistance can be granted to undergraduates, particularly to men of high potential capacities who could enter college with scholarship aid, but who otherwise would not go beyond high school. The assistance of trained men in industry in selecting the most suitable candidates for freshman scholarships should prove of great value.

The above issues of staff personnel and student body are easily the most vital ones in my opinion. I would, however, suggest consideration of several other points.

(a) Industry's policy on employment of technical graduates should be steadied, to avoid continuance of the feast-famine-feast cycle of the last ten years.

(b) Industry should recognize that the school's primary function is to help its students develop the ability to think and to execute. Much of the man's education must be secured after he has graduated from college and his development will depend largely upon the degree to which industry recognizes its responsibilities to foster such development. In this connection industry might well send certain of its best men back to the university for further specialized training and the advantage of renewed contact with university work.

In line with the above comments, I have little sympathy for the type of criticism of universities which is based upon their failure to impart specific factual information to their students. Furthermore, I do not feel that the problems of arranging an adequate curriculum within the time limitations of a four-year course are a serious factor, since the opportunity to do graduate work is open to better men and should be still further extended.

Mass Production Criticized

By Fred H. Rhodes
Professor, Chemical Engineering
Cornell University

One way in which the industries can be of real service to the universities is by the extension of the present practice of offering temporary summer employment to promising students after the second and third and (in those schools that are offering five-year courses in chemical engineering) fourth years of university work. From the standpoint of the students, the advantages of such an arrangement are obvious.

From the standpoint of the employer, the advantages of this arrangement are less obvious but, I believe, no less real. It gives the company an opportunity to make contact with really promising young men and to observe how these men handle the problems by which they are confronted. With this arrangement there is, I believe, less chance for the company to select for permanent employment a man who will not "stand up" in actual service. Some companies have hesitated to accept men for summer employment because they fear that these men will learn certain "plant secrets" and carry these with them to other companies. It is our observation that this does not occur to any noticeable extent. In the first place, the type of work done by these men in temporary summer positions is usually such that they do not come into contact with the secret processes; in the second place, the probability of the violation of operating secrets by these men is no greater than the probability of violation by any group of technical employees.

Another way in which the industries can be of service to us in training chemical engineers is to offer summer employment to the younger men on the teaching staff. A very considerable amount of the instruction in the university is done by these younger men—instructors or younger assistant professors. These men are capable, intelligent and well-trained, but are often lacking in

actual industrial experience. By affording these younger men an opportunity to do summer work, the industries can make a real contribution to the improvement of the instruction in the universities. Here again, the service is not a purely altruistic one, but may result in a direct benefit to the industry. There are many research problems of general interest and value to the industry as a whole. Many of these problems can be solved in the university laboratories just as well as in the laboratories of the individual companies. By working in temporary summer positions the younger men on the teaching staff are acquainted with the problems that are of real importance, and are better able to conduct and to direct research along these lines.

One most serious problem in administering a course in chemical engineering is the difficulty of retaining our really good men in the junior teaching positions. The salary of an instructor is normally between $1600 and $2500 a year; any man qualified by ability and training to hold the position of instructor in chemical engineering could probably earn from $3,000 to $4,000 in industry. There are, of course, certain advantages and certain attractions to teaching work, but in most cases these special inducements are not great enough to outweigh the difference in salaries. One obvious solution is for the universities to increase salaries—but unfortunately this is not generally possible. Most of the Eastern universities are largely supported by endowments; the funds are, for the most part, from interest on bonds. Within recent years the general decrease in interest rates has resulted in an actual decrease in income. Combined with this we have had a marked increase in enrollment. Our teaching load has been increased; the cost of supplies is rising; and the money available for supplies and salaries is decreasing. Unless the industries are prepared to see a decrease in the number of men trained for professional engineering positions and a possible lowering of the quality of instruction for these men, some method must be devised to enable us to retain good men in our junior teaching positions.

I believe that this situation may be met, to some extent at least, by the practice of offering summer work to the junior men on the teaching staff and also by extending to such men grants for research to be done at the university.

Within recent years we have been calling on industry to help us in the teaching of chemical engineers by allowing us to take groups of our senior students on inspection trips through the chemical plants. It is our experience that these inspection trips are of very direct value to the men in giving them some idea of the way in which chemical engineering operations are really conducted. Most companies have been willing to open their plants to us for such inspection trips; some companies, however, have refused to do so, either because they fear that certain secrets of their operations may become public or because they do not care to undergo the confusion incident to such visits. We realize that there is a certain unavoidable interference with the normal operation of a plant when a group of students makes such a visit. Our only excuse for asking the plants to submit to this inconvenience is that we are training these men for industry and that we do not feel that we are unreasonable in asking the industries to give us this assistance.

It is my frank opinion that, on the whole, the average student of today compares very favorably with the average student of 5 or 10 years ago. He is really more serious and is less concerned with the froth of college life. Of course, we still have a few men who are "being sent to college." Because, however, of the large number of entering students in the technical courses and because of the limited facilities for taking care of these men, we are becoming increasingly critical of the men that are allowed to continue in the work in chemical engineering, and students lacking in either ability or application are eliminated very early in the course. In some ways, I believe that the men that are now entering the university are not as well prepared as were the entering students of several years ago. It is my opinion that our high-school courses have been "broadened" to such an extent that they are pretty shallow. The men seem to have a greater equipment of facts at their disposal, but lack training in clear and logical thinking. Another great weakness of the average entering student is his inability to write good English. This inability is due in part to lack of proper training in English; it is also due in part to lack of training in logical and analytical thinking.

I believe that a part of our present difficulty in training chemical engineers is caused by the great increase in the enrollment in the professional courses. "Mass production" methods are not satisfactory in education. When the number of students becomes so great that the men in responsible charge of the courses cannot be directly in contact with every student, the work of instruction must be delegated largely or in part to younger assistants who are lacking in teaching experience and, sometimes, in interest in the work of teaching. We here have tried to meet this situation by rather severe restriction of the number of men that are allowed to continue in the more advanced work in chemical engineering and by limiting enrollment in the advanced courses to those men that have demonstrated their ability to profit by this advanced work.

Industrial Uses Salt Cake

The U. S. Tariff Commission, through a questionnaire sent to producers and importers, has obtained detailed figures on the use of the various forms of sodium sulfate in industry in the U. S. during 1935. These figures show total consumption of saltcake as 296,011 short tons, of which 216,775 tons went to the sulfate pulp industry, 31,325 tons to the glass industry, 31,262 tons to heavy chemical manufacture, and 16,649 tons to miscellaneous purposes, etc. Consumption of Glauber's salt during the year was 41,841 tons, of which 24,920 tons went to textiles, 2,799 tons to medicinals, 973 tons to tanning, and 43 tons to coal-tar dyestuffs. The balance, namely, 13,106 tons, includes, as in the case of saltcake, sales to jobbers and brokers, a large part of these sales going to the industries specified above.

Making History in the Sulfite

A Survey of Recent Developments which are Creating a New Enormous Chemical Market in the Southern States

THE kraft pulp process was first employed by Dahl in Germany in 1884 to use waste wood and reduce the cost of soda pulp by utilizing by-product salt cake of the hydrochloric and nitric acid industries. Practically all nitric acid was then made from Chile saltpeter and the acid consumption was rapidly increasing. Dahl found that kraft pulp was stronger than soda pulp and that the yield per ton of wood was better. Like the soda process, economical operation was associated with recovery of chemicals and instead of soda ash replacement, sodium sulfate (salt cake) was needed. Despite the unpleasant odor of the mercaptans (sulfur alcohols) in the waste and relief gas, the kraft pulp industry developed in Europe quite rapidly, especially in Sweden.

As the Ostwald synthetic process replaced the making of nitric acid from saltpeter, the supply of salt cake, as a by-product, rapidly decreased and the price advanced. However, there is much sodium sulfate in dried up salt lakes in the United States and Canada, and some of these are now being worked to supply the kraft pulp mills with low cost sodium sulfate.

Production of Kraft Pulp

The first kraft pulp mill in North America was operated by Brumpton at East Angus, Quebec, in 1907. Production at first was small. In 1909, the first kraft pulp mill was built in the United States at Muskegon, Mich. Other kraft mills followed, and the American production rapidly increased.

Production figures based on the "United States Census of Manufactures" are as follows:

Wood Pulp (tons)

	Total	Kraft	Percentage Ratio of Kraft
1914	2,893,150	52,641	2
1919	3,517,952	120,378	
1920	3,821,704	188,851	
1921	2,875,601	140,760	
1922	3,521,644	243,681	
1925	3,962,217	412,690	
1929	4,862,885	922,674	20

Some additional approximate figures from various sources are:

	Domestic Kraft	Imports
1930	950,000	400,000
1935	1,500,000	600,000
1936	1,800,000	720,000

Over ten per cent. of the kraft pulp produced is now being bleached and this percentage will probably increase rapidly. From 1927 to 1929 Louisiana's kraft mill production, from its seven mills increased from 179,878 to 246,590 tons.

Pulpwood consumed in the United States in 1899 was 1,896,310 cords at an average price of $4.95 per cord. In 1929, it was 7,645,011 cords at an average price of $13.09 per cord. In 1932 price of kraft pulp was about two cents per lb. or $40.00 per ton, a price which has, naturally, increased since that time. Business in 1936 was good in the kraft pulp industry. For 1937 production will probably show an increase; and for 1938, if labor troubles are overcome and more confidence is inspired in government and legislative action, United States kraft pulp production should be over 2,000,000 tons.

Raw Materials

Although a wide variety of woods can be used, economically, coniferous woods are best. Of wood used at present, about one-third is yellow pine. About 12 to 15 per cent. each of tamarack, spruce, hemlock, jack pine, white pine, and saw mill waste account for the other two-thirds.

In 1918 the U. S. Department of Agriculture reported a total of almost 300,000 cords of wood used in the making of kraft pulp. Of this amount 91,000 cords was yellow pine, 45,000 cords was tamarack or larch (*larix laricina*), 38,000 hemlock, 37,000 spruce, 34,000 balsam fir, 32,000 slabs and mill waste, 11,000 jack pine, and 9,000 white pine. These figures show that the South with its yellow pine was then already a prominent factor in the kraft pulp industry.

There is evidence to show that slash pine will grow to pulp wood size in the South in 20 to 25 years, espe-

Prof. Brautlecht gained his Ph.B. at Yale in 1906 and Ph.D. in 1912. He has conducted research on the chemistry of pulp and paper and will be remembered by our readers as author of the article on the chemurgic possibility of potato starch, published last year.

Pulp Industry

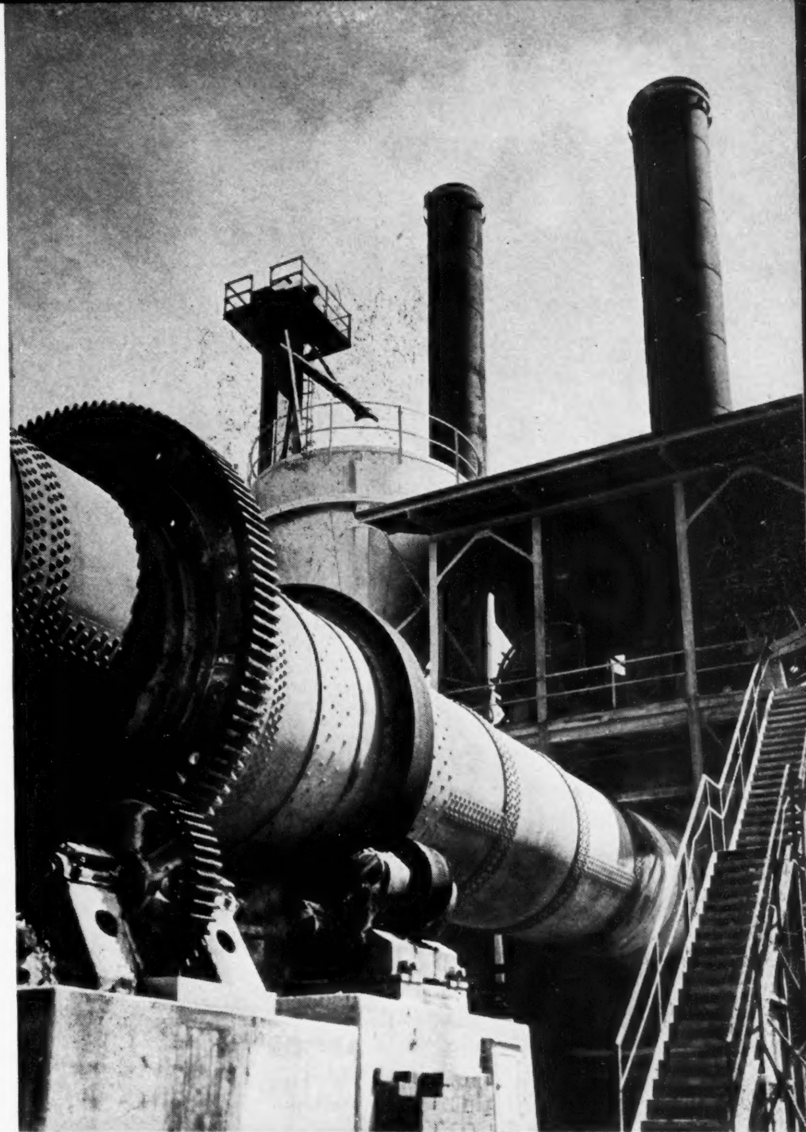
By C. A. Brautlecht

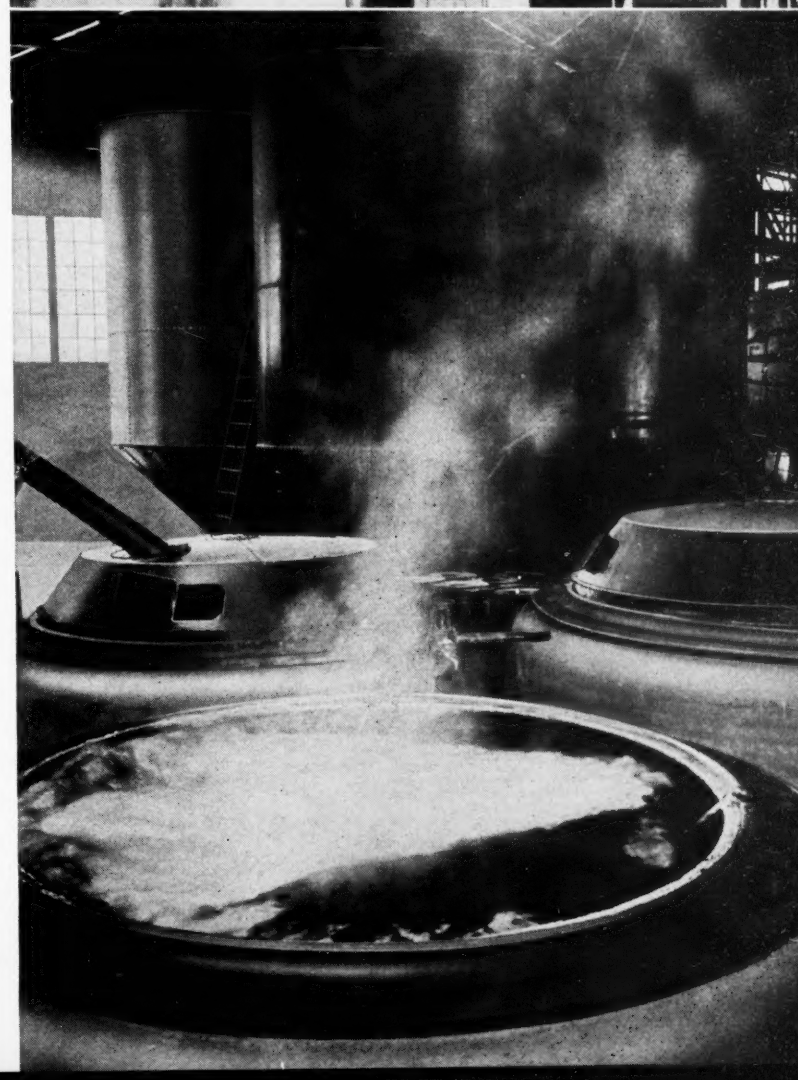
Head, Department Chemistry & Chemical Engineering
University of Maine

cially on former cotton land, and can be delivered at about $5.00 per cord at the mill; whereas costs in the North will probably be $10.00 to $15.00 per cord. This will favor the southern mills.

The other raw materials used in quantity can be obtained locally or at low cost in the South and produced from practically inexhaustible raw materials. Calcium carbonate is available from limestone and oyster shell masses. Little replacement of salt cake is needed in the new modern kraft mill. Lime for causticizing is available in large quantities and at a low cost. Chemicals needed are available from three new large alkali plants in the Gulf States. Other raw materials and low cost fuel are available in the Gulf States for chlorine, kraft pulp, the alkali, and related industries, in the form of rock salt, sulfur, coal, and natural gas. Water of suitable quality is abundant. Open, low cost building construction; relative proximity to the present center of population near St. Louis and nearer to the future center of population; low cost transportation; tend to low capital, low production and low distribution costs, giving the South a favorable economic location.

Naturally, there is a limit to this expansion economically. I will not be one to predict whether the South could stand a hundred or two hundred per cent. expansion in kraft pulp production during the next decade. At present, an additional 50 to 100 per cent. expansion of production appears to be sound, and naturally some older kraft mills, in relatively poor locations, will cease to exist due to excessive taxes, too high a cost for modernization forced by competition, discontinued labor subjected to frequent agitation, burdensome regulations as to waste disposal, too high competitive costs for raw material and high transportation costs. Examples of such plants which have been or are being closed are the Continental Bag & Paper Co. unit in Rumford, Maine, closed last year, and the Union Bag & Paper Co. mill at Kaukauna, Wis., is now being closed. Both companies have new, profitable kraft mills in the South. It is interesting to note that but twenty years





Upper, lime plant; and lower, caustic soda tanks, in new plant of Champion Paper and Fibre Co., Houston, Texas. Courtesy, The Manufacturers Record.

ago the Continental mill at Rumford was regarded as a modern mill. Illustrations from this mill appeared in an article on paper in the *New International Encyclopedia* (1916). By 1936, it could not compete with the new mills in the South.

A study of the total stands of timber suitable for kraft, in millions of cords, by regions, in an article on the "Suitability of American Woods for Paper Pulp" by S. D. Wells and J. P. Price, makes plain why we are witnessing a great growth in pulp and paper production in the South. Southern yellow pine is the outstanding raw material of the country for the sulfate or kraft pulp process and about 942 million of cords is concentrated in the lower Mississippi and South Atlantic regions. It reproduces itself in the South in quantity to a greater extent than can northern woods.*

In Canada, Huron Forest Products Ltd., plans to build a new mill to cost $3,000,000; and the Brown Company plans increased production at LaTuque. In Europe, recent increased facilities at Ostrand, Sweden, the doubling in capacity in Finland, and increase, especially of bleached kraft, in Germany are marked advances that indicate the world trend.

Although most of this increase in kraft pulp is going into boards, much is also going into wrapping, bag, and miscellaneous papers. Some bleached kraft is replacing bleached sulfite for certain purposes as the worldwide demand for the latter, for rayon making, increases. Although many soda pulp producers were worried about demand a few years back, better business in the book and magazine field has increased the demand for soda pulp even with more deinked stock available.

New Production Facilities

Some examples of progress in added American production are of interest. There are many new modern kraft pulp and board or paper mills in the South, especially in Georgia and Florida. International Paper Co. "produced about 580,000 tons of kraft paper and board in 1936 as against about 459,000 tons in 1935." This company is building a new kraft board mill in Georgetown with an initial capacity of about 200,000 tons annually at a cost of about $6,300,000 and will build another mill at Webster in northwestern Louisiana of about 235,000 tons capacity at a cost of about $8,000,000, to start operating in 1938.

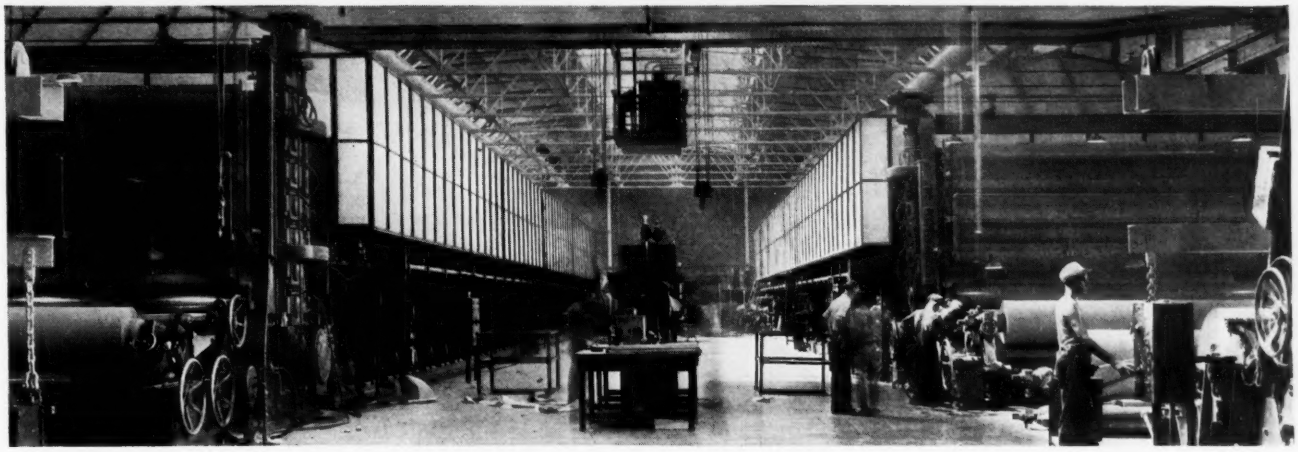
The new kraft mill of the Champion Paper & Fibre Co. at Pasadena, Texas, on the Houston Tide Water Ship Canal, starting operations in 1937, producing about 55,000 tons of bleached kraft pulp a year, will serve as a third strategically located unit, with the other mills of this company in Ohio and North Carolina. Pulp wood will be available from stumpage contract on about a million acres of nearby land. As with the Union mill at Savannah, plans were made for enlargements, in this case costing about $1,500,000, before the first unit was in operation. Nearby, this company has a salt deposit, under lease, from which low cost salt solution can be obtained for electrolysis, to yield chlorine for bleaching. There is a good description of this mill in a recent number of *The Paper Trade Journal.*

The Savannah Union Bag Co. mill, costing about $6,500,000, received much publicity and called attention to the older kraft mills in the South such as the Advance Bag & Paper Co. and Southern Kraft. Alexander Calder, president of the Union Bag & Paper Corp., in referring to their new units is reported to have stated (*The Paper Mill*, June 19, 1937, p. 5), "the completion of the new unit at Savannah is the second major step in our program of self-sufficiency in the matter of our pulp requirements. When our third Savannah unit goes into production in the Fall, we shall be practically independent of outside sources of either kraft pulp or kraft paper at a saving of $3,000,000 annually on today's market."

A number of container board companies have built, are building, or are planning kraft board mills. Fortunately, most of these are old, well established companies, with established markets; companies which will cautiously avoid over-expansion. Included in this group are the Kieckhefer Container Corp. with a kraft and board mill to begin operations in 1937 at Plymouth, S. C., of about 60,000 tons per year capacity, costing about $3,500,000; National Container Corp. to build a kraft and board mill at Jacksonville, Fla., of about 60,000 tons per year capacity, to cost about $3,000,000; and Container Corp. of America, planning a kraft pulp and board mill at Fernandina, Fla., with a capacity of about 40,000 tons per year at a cost of over $1,000,000, to begin operations in 1937. There are reports that the United States Lumber Co. may build two or three kraft pulp and paper or board mills in Mississippi and that a mill may be built at Pensacola, Fla. The Crossett Lumber Co.'s new mill in Arkansas, beginning operations in 1937, has been described in detail in many of the paper trade journals. As in the other new mills, the efficient recovery of chemicals, and efficient use of heat and power is given much consideration at Crossett. The Chesapeake Camp Corp. at Franklin, Va.; the St. Joe Paper Co. at Port St. Joe, Florida; the West Virginia Pulp and Paper Co. at Charleston, S. C., are scheduled to begin operations in 1937; and the Brunswick Pulp and Paper Co. (Mead-Scott Companies) is to build or is building a mill at Brunswick, Ga. With the other companies mentioned these represent an investment of about $70,000,000 in new mills. With the large government power projects in the Tennessee Valley, low cost power will also be an important competitive factor.

Meanwhile, reports indicate the probability that a newsprint mill will be built in the South. The Southland Paper Mills, Inc. has been organized to build a 45,000 ton per year newsprint mill in Texas, using southern pine and costing about $5,000,000. Southern newspaper publishers will probably make contracts with this organization, possibly at prices lower than $50 per ton, the 1938 standard price for newsprint made in the

*United States Department of Agriculture, Bulletin 1485, table 2, page 4 (1927.)



Calender end of two new machines at the Union Bag and Paper Corporation, Savannah, Ga., having speed and productive capacities greater than any previous installation in Am:rica. Photograph, courtesy Pusey and Jones Corporation.

northern part of the United States and in Canada. These developments indicate that the South will probably be our chief paper producing section during the next half century.

Uses

Unbleached kraft paper has been extensively used as wrapping paper. For wrapping periodicals and journals for mailing, it is ideal. It first came into this use when price considerations led to its substitution for manilla wrapping paper. With grease-proof papers, essentially as liners or primary wrappers, it came into extensive use for wrapping meats and fatty foods in groceries and meat markets.

Because of its lightness and strength it is the best wood pulp for making container board, for making industrial bags of all kinds, including cement bags (sometimes also as a liner for burlap bags) and for packaging and wrapping in retail stores.

The bleached kraft pulps, now available, using multistage bleaching, with chlorine followed by hypochlorites, make possible papers of all shades from the natural manilla shade of the unbleached kraft to fine whites or blue whites. Such white papers with the strength of unbleached kraft will find increasing use in the miscellaneous paper field and as text book paper. Some will probably replace all-sulfite bonds and some mixed sulfite-rag papers for record and writing purposes.

Wood pulps of all kinds continue to be imported, especially from northern Europe. These regularly include some kraft pulp. A reduction in imports is inevitable and some increase in exports of kraft paper can also be expected.

Although spruce turpentine has been obtained to some extent as a by-product in kraft pulp production for many years, the new plants with heat exchangers for relief gas will accomplish better results as to yields, quality and costs. As about 50 per cent. of the wood accumulates in the black liquor, which must be worked up, more effort may be made to extract other products than carbon, or utilize the carbon to better advantage as fuel. Calcium carbonate is also being worked up more efficiently in lime recovery.

Major improvements during the past decade in kraft pulp making have involved more efficient heat utilization in cooking and chemical recovery, improvements in equipment to reduce maintenance and shut downs, replacements of batch by continuous processes in causticizing, water cooled walls in furnaces, better washing, use of recovered carbonate of lime in making sulfite acid, condensation of blow-off and relief gas to recover turpentine and cymene as well as to effect heat exchange and reduce mercaptan escaping into the air, more indirect cooking with pump circulation, and introduction of more efficient multiple effect vacuum evaporators for black liquor.

I know of no installation of a de la Rosa continuous digester to produce kraft pulp. This would be watched with much interest, as an example of the present trend from batch to continuous processes.

With the utilization of southern woods will come more economical recovery of turpentine and rosin. More tax money will be used for national forests and to reduce or prevent forest fires and insect and disease damage. The management of kraft mills, with large capital investments, will support forest protection and natural and artificial reforestation.

Uses for Spent Clay

The Bureau of Mines in a recent report on Fuller's earth and the consumption of such bleaching clays in the refining of petroleum products, says that progress is being made in finding uses for spent earth. It may be too much to expect that earth will be thrown away after being used only once, but if the spent earth could be disposed of profitably, there would be less incentive for revivifying it after its efficiency had been impaired substantially. For about five years a leading cement company in California has been making a weatherproof Portland cement, adding to the clinker before grinding about 3 per cent. of spent clay containing 20 to 30 per cent. carbonaceous matter. The process (U. S. P. 1,755,638) yields a product that is at least as strong as ordinary Portland cement although it does not mature so rapidly. *Ceramic Age*, August, 1937, p. 47.

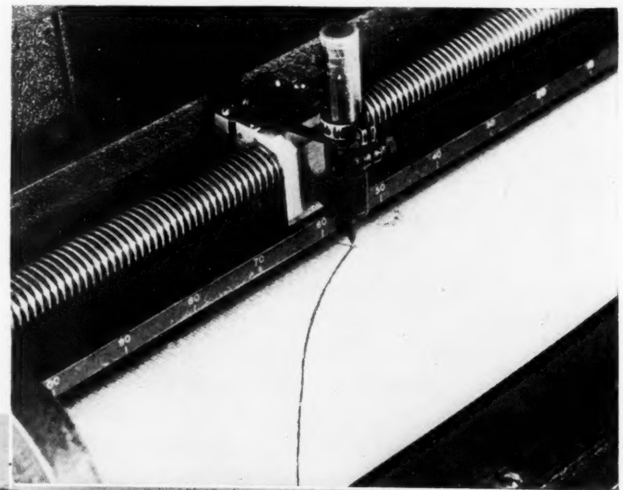
Modern Machine Reveals Secret of Ancient Art

Photo-Electric Eye Analysis Colors

A curve on a drum solves a pigment problem which has puzzled colorists and chemists

IN the research laboratories of the Interchemical Corporation, the recording photo-electric spectrophotometer has proved that the blue coloring matter used on murals by the Romans was substantially identical with the much older blue color used by the Egyptians. The Roman pigment is known to have been made of lime, natron (natural sodium carbonate) and copper carbonate; but the secret of its manufacture was lost in the Second Century.

The spectrophotometer can be applied to the analysis of any color on any material, and while the recorded curves have not been correlated to known pigments or dyes, nevertheless identical curves mean similar coloring matter. The color to be tested is placed at the end of the long, large tube, and the results are shown on the recording device (enlarged in the inset).



TIN

as a Chemical Raw Material

Part 2

By Bruce W. Gonser

Metallurgist, Battelle Memorial Institute

TIN is not well distributed in the earth's crust. From the standpoint of the United States, it is entirely a foreign metal; in fact, little or no tin is mined in any of the leading industrial countries of the world. The principal mining centers are southeastern Asia (Malaya, Netherland East Indies, Siam, and China), Bolivia, and Africa. Table IV shows the primary tin production by countries since 1914.

A little tin has been mined in the United States, but compared with that consumed it has been insignificant. Most of the United States tin mined in the last ten years has come from Alaska. Recently the mining of tin in Alaska and in the Carolinas has been stimulated, but even the most optimistic surveys have failed to disclose sufficient ore of commercial grade to warrant the hope that a prosperous tin mining industry could be established to supply an appreciable part of the country's requirements.

By far the most important ore of tin is cassiterite, the higher oxide, SnO_2. It has been mined in the past largely as pebbles in alluvial deposits, but in recent years lode mining has become increasingly important. Tin from southeastern Asia is largely recovered from alluvial deposits by dredging or by using various sluicing methods of sorting the heavy tin stone particles from barren gravel. Lode mining is best exemplified by tin recovery in Bolivia where practically all the ore is obtained by straight underground blasting-mining methods. The ore as mined may only contain a pound of tin per cubic yard dredged, or frequently less than a per cent. of tin when lode mining on a large scale or treating old tailing dumps.

Tin ore is normally concentrated to give a 60 to 72 per cent. tin content before shipping to the smelter. In the case of placer or alluvial mining, this is a relatively simple operation of gravity concentration using jigs and sluices. Where the ore is finely disseminated through barren rock, as in most vein deposits, an elaborate treatment may be necessary, involving crushing, classification, fine grinding, and concentration by jigs, tables, or to some extent by flotation, much as copper or lead ores are concentrated. As a consequence of more difficult mining and concentrating operations, Bolivian costs are on the whole considerably higher than those for dredging in southeastern Asia or mining in Nigeria, even though the grade of ore may be much higher in Bolivia.

Primary smelting of concentrates takes place by solid carbon reduction in a blast furnace or reverberatory, the latter being used in the most recently designed

TABLE IV. PRODUCTION OF PRIMARY TIN—1914 TO 1936—Long Tons.*

Year	Malaya	Bolivia	Netherland East Indies	Siam	China	Nigeria	Belgian Congo	Australia	British India	Japan	United Kingdom	Indo China	U. S. A. Inc. Alaska	Other Countries **	World Production
1914	50,643	22,002	19,476	6,591	7,008	4,300	42	5,401	287	288	5,056	71	93	2,799	124,057
1915	49,832	21,450	20,000	8,998	7,874	4,837	18	5,836	430	336	4,968	97	91	2,933	127,700
1916	47,224	20,811	21,848	8,765	7,509	5,731	94	5,692	439	249	4,697	99	124	2,857	126,139
1917	42,903	27,418	20,265	9,153	11,614	5,820	125	4,940	607	150	3,936	119	98	2,535	129,683
1918	40,105	28,818	19,816	8,835	8,366	5,904	114	4,747	647	166	3,954	138	62	2,204	123,876
1919	39,240	26,956	20,901	8,542	8,691	5,728	136	4,783	1,078	100	3,272	134	50	1,722	121,333
1920	36,927	29,075	21,566	6,201	10,566	5,167	334	5,233	1,648	202	3,065	166	20	2,191	122,361
1921	36,240	28,500	25,353	6,150	6,321	5,025	410	3,592	1,362	289	680	305	4	1,389	115,620
1922	37,226	27,685	29,532	6,979	9,032	5,123	567	2,570	1,530	282	370	404	1	994	122,295
1923	39,383	30,636	24,957	6,334	7,936	5,860	959	3,283	1,305	300	1,021	354	2	1,796	124,126
1924	46,917	31,553	31,460	7,256	6,993	6,200	966	3,069	1,375	341	1,986	463	6	2,215	140,800
1925	48,146	32,224	31,326	6,802	8,880	6,256	1,059	3,016	1,616	385	2,420	581	12	2,305	145,028
1926	47,790	30,061	31,851	6,978	6,506	7,417	1,090	2,860	2,413	537	2,330	593	7	2,430	142,863
1927	54,390	35,808	33,735	7,435	6,218	8,056	854	3,144	2,447	669	2,593	699	24	2,645	158,717
1928	64,505	41,404	35,215	7,527	7,030	9,123	785	2,890	2,256	882	2,761	751	42	2,636	177,807
1929	69,366	46,338	35,730	9,939	6,776	10,734	970	2,239	2,402	901	3,271	829	35	2,652	192,182
1930	63,974	38,146	34,903	11,060	6,860	8,692	860	1,451	2,749	1,255	2,488	993	15	2,466	175,912
1931	54,908	30,742	27,480	12,447	7,072	7,229	141	1,750	2,006	1,560	598	874	4	2,367	149,178
1932	29,742	20,583	15,683	9,261	7,668	4,263	683	2,138	2,534	1,541	1,337	1,001	0	2,964	99,398
1933	24,904	14,725	14,406	10,324	8,104	3,762	2,225	2,810	2,399	1,522	1,543	1,038	3	3,089	90,854
1934	34,059	20,634	18,678	10,587	8,092	4,996	4,602	2,986	2,487	1,803	1,981	1,070	8	2,898	114,881
1935	45,955	27,168	24,719	9,779	9,398	7,029	6,481	3,130	2,991	2,197	2,041	1,421	41	4,469	146,819
1936	66,806	24,074	31,546	12,678	10,664	9,529	7,514	4,300[1]	3,108	2,329[1]	2,083[1]	1,409	87	2,830	179,600[2]

*Statistical Year Book, 1937, International Tin Research and Development Council, p. 12.

**Countries currently producing less than 1,000 long tons per year are: Union of South Africa, other African countries (not specifically mentioned), Portugal, Spain, Mexico, Argentina, Germany, Austria, and Czechoslovakia.

[1] Preliminary.

[2] Estimated, or partly estimated.

TABLE V. PRODUCTION OF SECONDARY TIN IN THE UNITED STATES (Long Tons)* 1914 to 1936.

Year	Tin recovered as pig tin	Tin recovered in alloys and chemical compounds	Total
1914	4,049	7,064	11,113
1915	4,687	7,500	12,187
1916	6,785	8,750	15,535
1917	5,557	11,964	17,521
1918	6,376	14,906	21,282
1919	5,336	16,121	21,457
1920	6,428	14,533	20,961
1921	4,821	10,268	15,089
1922	5,866	11,554	17,420
1923	7,046	19,927	26,973
1924	6,875	21,071	27,946
1925	7,098	20,536	27,634
1926	8,705	21,116	29,821
1927	7,857	25,089	32,946
1928	7,321	24,643	31,964
1929	6,607	24,018	30,625
1930	5,000	18,393	23,393
1931	4,911	12,768	17,679
1932	4,152	9,018	13,170
1933	6,473	13,259	19,732
1934	7,366	14,866	22,232
1935	8,571	16,339	24,910
1936	6,473	18,545	25,018

*Statistical Year Book, 1937, International Tin Research and Development Council, p. 45.

plants. Since stannic oxide is amphoteric or willing to unite with either acid or basic fluxes, it is practically impossible to get a clean separation of metal and slag by reduction in one operation as with most metals. After primary smelting, therefore, part or all of the first (silicious) slag, which may contain 10 to 20 per cent. tin, is resmelted in a reverberatory or blast furnace with more coke and usually some limestone or scrap iron to effect a further recovery of tin. Thus, only about a per cent. of tin may be left in the second or discarded slag under good operating conditions. The crude metal is refined by liquation to remove most of the iron, copper, arsenic, and antimony as a dross. Such impurities are further reduced in amount by poling with green wood or with compressed air.

At the present time, over two-thirds of the primary tin is smelted in Great Britain or British possessions. This includes most of the tin concentrates produced in Bolivia, Nigeria, and Siam, as well as from possessions of Great Britain. The Netherlands control most of the remaining production. Independent smelters are in China, Belgium, and Germany. Although some tin was smelted in the United States during and for a few years after the World War (ore imports are shown in Table VI), the attempt was not economically successful in competition with old established smelters elsewhere. Since 1923, no commercial tin smelter has been in operation in this country, although some tin concentrates have been smelted experimentally or with other metals. Recently there has been considerable discussion in metal trade publications on the possibilities of establishing a tin smelter in the United States to operate on both imported and domestic ores. Lincolnton, North Carolina, has been mentioned as the location of such a smelter, as some domestic ores are being developed in that vicinity. Establishment of a tin smelting industry was recommended by the United States Tin Investigation Committee.[1]

Secondary Tin. Although the United States does not produce an appreciable amount of tin ore and smelts no primary tin at present, the production of tin from secondary or scrap sources is a very important factor, normally amounting to a fourth of the total tin consumed. This production of secondary tin since 1914 is shown in Table V.

Part of the secondary tin production comes from detinning plants which operate only on clean tin plate scrap resulting from the manufacture of containers and other articles made from tin plate. Some used containers have been detinned in the past at various points in the United States, particularly in 1926 and 1927, but such treatment has not proven to be commercially feasible. Lower recoveries of tin are obtained than with clean tin scrap, and the resultant scrap iron is of poor grade. The average annual production of detinning plants between 1924 and 1933 inclusive was 861 long tons of high-grade metallic tin and 1,983 long tons of chemicals. Detinning may consequently be regarded as a chemical industry. Stannic and stannous chlorides and stannic oxide composed most of the chemicals produced. Table VI gives the United States production of these compounds.

TABLE VI. PRODUCTION OF TIN SALTS AND COMPOUNDS IN THE UNITED STATES, LB.*

Year	Tin Oxide	Stannic Chloride	Stannous Chloride	Total
1919	1,352,345	8,999,416	..	10,351,761
1921	1,181,819	7,335,044	..	9,200,000[1]
1925	4,788,334	11,947,001	652,258	17,387,593
1931	3,330,156	34,871,533	193,347	38,395,036
1933	2,743,000	18,888,000	302,000	21,933,000

[1] Partly estimated.
*United States Bureau of the Census.

A number of plants rework their own tin bearing scrap into usable form, and secondary smelters purchase tin in various forms from miscellaneous sources. Usually it is more economical to rework such scrap into solder, bronze, bearing, and type metal or chemical compounds than to refine to pure tin. During 1924 to 1933, for example, the average annual production of tin reclaiming plants (other than detinning plants) was 4,925 long tons of metal and 14,635 long tons of alloys and chemicals.

Secondary tin is important to the chemical industry because it forms the source of most of the tin chlorides, sodium stannate, and part of the tin oxide produced in the United States. It also serves as a storage or reserve of tin which would be of great value in case tin imports were restricted for any reason. Realizing this, the gov-

[1] Tin Investigation. Report of the Subcommittee of the House Committee on Foreign Affairs. United States Government Printing Office, 1935.

ernment has placed restrictions upon the exportation of tin plate scrap.

Imports and Exports. Since the United States is not a producer of primary tin, practically its whole requirements are met by imports. Over the last ten years this has amounted to about 45 per cent. of the world's production. Table VII gives the imports and exports since 1914.

A relatively small amount of imported tin and some domestic (secondary) tin is exported from the United States. Most of this goes to Canada; minor amounts are exported to Mexico and Central and South American countries.

Division of imports according to brands or source is shown in Table VIII. Additional information on the source of ores, location of smelters, and grades of tin are given in Table XI.

Marketing of Tin. The London Metal Exchange largely controls the world market for tin, and its quotations govern the selling price of metallic tin practically everywhere. The prices of tin ores and chemicals are in turn governed by the basic price of metallic tin. Usually tin smelters sell metallic tin in proportion to and simultaneous with the purchase of ores in order not to get caught by fluctuating prices.

Tin is imported into the United States and marketed largely through brokers and importers who usually represent British dealers, or in a more or less indirect way the producing smelter. At times large users of tin import metal direct, but this is not normal practice. Some independent producers, as the Chinese and the Netherlands governmental agency, sell direct to importers.

Most of the marketing of primary tin and dealings in tin futures in the United States is handled through the Commodity Exchange of New York and is subject to various regulations of the Exchange. The following brands were covered by the standard tin contract* of November 19, 1934:

Class A

Banka Tin

Straits Tin:
- Straits Trading Co.
- Eastern Smelting Co.
- Po Hin
- Ban Hok Hin

English Refined Tin:
- Williams Harvey Mellanear Refined
- Penpoll Special Refined
- Cornish Refined
- Capper Pass & Son

German Refined Tin:
- Th. Goldschmidt "Baum"
- Berzelius "Rose Brand"
- Zinnwerke Wilhelmsburg Refined

Belgian Refined:
- Union Miniere du Haut Katanga

Australian Refined:
- O. T. Lempriere & Co.
- Mount Bischoff
- Pyrmont

Dutch Refined:
- H M B "Tulip"

Billiton Tin:
- Dutch Smelting Company "C S"

Class B

English Common:
- Williams Harvey Mellanear Common
- Penpoll Common
- Cornish Common
- Thames Metal Co.

German Common:
- Th. Goldschmidt "Volga"

Th. Goldschmidt "Tego"

Zinnwerke Wilhelmsburg Common

Chinese Tin:
- Chinese No. 1

Dutch Common:
- H M B "Lamb & Flag"

*Tin Investigation. Report of the Subcommittee of the House Committee on Foreign Affairs, 1934-1935. Government Printing Office, 1935.

TABLE VII. UNITED STATES IMPORTS AND EXPORTS OF TIN (Long Tons)*
1914 to 1936.

	IMPORTS			EXPORTS OF METALLIC TIN		
Year	Tin Concentrate, Content**	Bars, Pigs, Blocks, Etc.	Total	Domestic	Foreign	Total
1914	..	42,440	42,440	..	..	..
1915	493	51,602	52,095	..	..	..
1916	7,179	61,641	68,820	..	..	..
1917	8,084	64,437	72,521	..	..	..
1918	16,424	63,622	80,046	18	..	18
1919	17,139	40,044	57,183	273	68	341
1920	30,489	56,067	86,556	630	297	927
1921	13,696	24,197	37,893	1,030	363	1,393
1922	12,325	60,193	72,518	804	294	1,098
1923	2,692	68,934	71,626	750	296	1,046
1924	155	65,059	65,214	419	540	959
1925	191	76,646	76,837	361	571	932
1926	303	77,159	77,462	675	1,305	1,980
1927	122	71,142	71,264	1,010	1,229	2,239
1928	130	77,970	78,100	349	1,268	1,617
1929	128	87,132	87,260	789	1,140	1,929
1930	289	80,734	81,028	84	2,149	2,233
1931	30	66,064	66,094	[1]	1,661	1,661
1932	17	34,819	34,836	[1]	1,116	1,116
1933	24	62,842	62,866	[1]	1,041	1,041
1934	2	39,986	39,988	[1]	1,216	1,216
1935	178	64,258	64,436	[1]	2,292	2,292
1936	..	76,029	76,029	..	381	381

* American Bureau of Metal Statistics. Year Book, 1932, p. 104 and Year Book 1935, p. 108. Figures for 1936 from Statistical Year Book, 1937, International Tin Research and Development Council.
**1915 to 1923 inclusive, tons of ore; 1924 to 1935 inclusive, tin content in ore.
[1] Not separately reported.

The brands in each class are considered to be equivalent, and the seller may deliver at the contract price any one of the brands listed. Class B brands carry a deduction of 1⅛ cents per pound under the contract price and must be accompanied by a certificate of one of the official assayers of the Exchange certifying that the tin has passed the requirements by the metal trade group. A minimum of 5 long tons of tin must be composed of one brand; in other respects more than one equivalent brand may be used in filling a contract.

In addition to the standard tin, sales of Straits tin are made through the same Exchange using a special Straits tin contract in which brands produced by the Straits Trading Company and Eastern Smelting Company (Singapore and Penang) are considered equivalent and interchangeable (in lots of 5 tons or more). The Straits tin and those brands listed under Class A-Standard must have a minimum tin content of 99.75 per cent.; the Class B-Standard or English, Chinese, or German common brands must have a minimum tin content of 99.00 per cent.

The American Tin Trade Association, composed of dealers, importers, and some of the large consumers of tin, operates to facilitate trade in tin and establish standards. A research committee of this organization coöperates with the International Tin Research and Development Council, which is discussed later.

Secondary tin and alloys and chemicals produced by detinning plants and scrap metal smelters are usually sold direct to consumers and supply houses. This is frequently at a discount from primary tin prices.

Table IX gives the average price for Straits tin since 1914. After high war prices, the price dropped to about 30 cents per pound in 1921 and well below 25 cents per pound in 1931 and 1932. Since 1933, however, the price has been fairly well stabilized at about 50 cents per pound due to effective production control. This is a fair average of the price during reasonably prosperous years.

TABLE IX. PRICES FOR STRAITS TIN, NEW YORK, CASH* 1914 to 1936

Year	Cents per Pound
1914	34.30
1915	38.59
1916	43.48
1917	61.80
1918	86.80
1919	63.33
1920	49.10
1921	29.92
1922	32.58
1923	42.71
1924	50.20
1925	57.90
1926	65.30
1927	64.37
1928	50.46
1929	45.19
1930	31.70
1931	24.46
1932	22.01
1933†	39.12
1934	52.16
1935	50.39
1936	46.42

*Statistical Year Book, 1937, International Tin Research and Development Council, p. 53.

†Gold price equal to 29.78, 30.86, 29.76, and 27.41 cents per pound respectively for period 1933 to 1936 inclusive.

A comparison of the price for Straits tin, Standard, and 99 per cent. or Class B tin for the last few years is given in Table X. Typical analyses of a number of

TABLE VIII. CLASSIFICATION OF TIN IMPORTS ACCORDING TO BRANDS *

Year	Straits	Australian	Banka and Billiton	English	Chinese	Tulip	Katanga	Sundries	Total
1915	42,071	10	3,253	3,430	1,420	..	..	188	50,372
1916	42,992	205	7,575	5,734	1,530	..	..	320	58,356
1917	32,675	1,483	9,273	6,155	5,177	..	..	104	54,867
1918	34,243	3,345	7,590	6,647	5,967	..	..	35	57,827
1919	26,225	1,675	2,271	4,700	165	..	..	368	35,404
1920	37,535	1,440	3,675	3,215	4,490	..	..	208	50,563
1921	20,319	345	210	1,426	2,203	..	..	255	24,758
1922	48,267	428	3,405	2.425	4,913	..	..	30	59,468
1923	50,395	440	4,018	7,485	5,609	..	..	155	68,102
1924	52,865	565	1,792	6,655	2,650	..	..	790	65,317
1925	57,375	400	605	13,500	4,370	..	..	15	76,265
1926	55,155	865	2,037	15.553	3,435	..	..	260	77,305
1927	55,650	645	505	12,589	1,475	..	..	1,290	72,154
1928	66,245	675	390	9.690	1,210	..	..	1,515	79,725
1929	70,434	561	533	13,394	3,985	..	..	595	89,502
1930	65,464	177	197	10,860	3,350	..	..	50	80,098
1931	55,744	405	141	4,306	3,200	..	..	1,215	65,011
1932	25,413	230	461	4,658	3,575	100	..	125	34,562
1933	35,100	30	1,392	20,331	3,790	60	..	120	60,823
1934	27,478	30	1,942	7,935	2,872	810	277	5	41,349
1935	36,234	..	2,628	13,372	4,360	1,600	400	185	58,779
1936	56,922	..	2,753	7,875	4,132	3,801[1]	1,155	150	76,788

* Metal Statistics, 1925, p. 319, taken from New York Metal Exchange as given (1915 to 1924); Statistical Year Book, 1937, International Tin Research and Development Council, p. 96 (1924 to 1936).

[1] Dutch refined tin.

most used brands of tin are shown in Table XI. The Chempur brand is of interest as a specially refined grade for use in testing or in making pure chemical salts of tin.

Production Control. During the early years of the depression, the price of tin fell so low and the stocks of tin were built to such a height that the entire tin producing industry fell into a rather chaotic condition. In order to establish a more orderly balance between production and consumption and to restrict production in an equitable manner, a production control scheme was organized in 1931 which was supervised by an International Tin Committee. This control was adopted after negotiations between representatives of the governments of the principal tin producing countries, Malaya, Netherland East Indies, Nigeria, and Bolivia. These member countries voluntarily reduced production according to a standard tonnage allotted each member, *i.e.*, the tonnage produced in 1929. Although production was drastically reduced, at one time to only one-third of the standard, the quotas were enforced, and Siam later joined the group. The scheme was entirely successful in regulating production and removing excess metal stocks. Prices rose to a point that assured prosperity among producers.

At the end of nearly three years of control a second agreement was reached to include Belgian Congo, Cornwall, French Indo China, and Portugal, bringing control in 1936 to 86.7 per cent. of the total world's production of tin. On January 1, 1937, the control scheme was renewed for three more years on the basis of the following standard quotas:

Malaya	71,940	long tons
Bolivia	46,490	" "
Netherland East Indies	36,330	" "
Siam	18,000	" "
Belgian Congo	13,200	" "
Nigeria	10,890	" "
French Indo China	3,000	" "

From the standpoint of the producer, the International Tin Committee has been entirely successful in balancing production and consumption. This has assured profitable operation and a stabilized market, which aids in preventing waste of tin resources. Objections to the scheme are principally based on fear of the growth of substitutes for tin and of increased recovery and use of secondary tin.

From the standpoint of the American consumer, the control scheme has been a mixed blessing in that desired stability has been attained, but the price of tin has been raised to a point which most consumers consider to be too high, particularly in view of the exceptionally low price of tin enjoyed just prior to adoption of international control. In an effort to meet consumer objections, representation of tin consuming interests has been made in the form of an advisory panel which brings to the attention of the Committee the viewpoint of the consumer. One of the problems which has not been adequately solved as yet is the maintenance of sufficient metal reserve to meet unusual economic conditions. This lack of a reserve tin supply has caused some fluctuations in price and difficulty in securing tin at times.

TABLE X. COMPARISON OF AVERAGE PRICE FOR STRAITS, ENGLISH REFINED, AND 99% TIN *

(Cents per Pound)

Year	Straits	99.75% Tin (English Refined)	99% Tin
1933	39.12	38.01	37.35
1934	52.16	52.04	51.18
1935	50.39	50.07	49.28
1936	46.42	46.42	45.72

*Metal Statistics, American Metal Market, 1937.

Research. A Tin Producers' Association was formed in 1928 primarily to help regulate tin production, gather accurate statistics relating to the tin industry, and to foster research on problems relating to tin. Its work on regulation was ineffective until enforceable governmental regulation went into effect with the formation of the International Tin Committee in 1931. The research objective was started in 1929 and by 1933 was organized as the International Tin Research and Development Council with headquarters in London. A statistical division of the Council was established at The Hague, Holland. This division publishes comprehensive data on the tin industry in monthly bulletins and in a Statistical Year Book.

The International Tin Research and Development Council deals entirely with research and development and has no connection with the International Tin Committee which regulates production, other than through certain members of both groups. The organizations have separate functions and work independently. Funds for the Research Council are obtained as a direct contribution from the governments of the principal tin-producing countries.

Work of the Research Council is largely devoted to development of new uses for tin, to obtaining fundamental information on the properties of tin and tin-bearing materials, and to disseminating information, both technical and non-technical, on subjects relating to tin. In particular, basic problems in all the major applications of tin are being, or have been, investigated. Results of these investigations are distributed free of charge through technical publications, informative circulars, and bulletins. The bulletins contain detailed reviews of the most important tin-consuming industries. In addition, a technical information service is maintained for users of tin. Although most of the research work of the Council, other than statistical, is conducted in Great Britain, many problems dealing with tin-consuming industries are being investigated at research institutions in the various tin-consuming countries. Thus, research on tin in the United States is centered at the Battelle Memorial Institute of Columbus, Ohio. The American office of the Council is located at 149 Broadway, New York City.

TABLE XI. AVAILABLE GRADES OF TIN *

Brand	Location of Smelter	Sources of Ores	Approximate Average Analysis						
			Tin	Antimony	Arsenic	Lead	Bismuth	Copper	Iron
Arnhem, Common	Arnhem, Holland	Dutch East Indies	99.102	.376	.059	.300	.029	.118	.016
Arnhem, Refined (Tulip)	Arnhem, Holland	Dutch East Indies	99.810	Trace	.056	.012	.031	.037	.014
Banka	Banka Dutch East Indies	Dutch East Indies	99.9589	..	.0140	.0001	nil	Trace	.0270
Mount Bischoff	Australia	Australia	99.795	.015	.063	.037	.005	.035	.042
Penang, "E. S. Coy."	Straits Settlements	Straits Settlements	99.914	.003	.026	.037	.006	.004	.005
Penpoll, Common	Liverpool	Bolivia and Cornwall	99.158	.190	.078	.386	.019	.129	.006
Penpoll, "Special Refined"	Liverpool	Bolivia and Cornwall	99.925	.005	.009	.038	.004	.0102	.004
Singapore	Straits Settlements	Straits Settlements	99.870	.008	.045	.034	.003	.052	.003
Williams, Harvey, Common	Liverpool	Bolivia and Nigeria	99.206	.136	.065	.468	.012	.081	.006
Williams, Harvey, "Guaranteed 99.9"	Liverpool	Bolivia and Nigeria	99.915	.013	.008	.037	.007	.009	.004
Williams, Harvey, "Standard Refined"	Liverpool	Bolivia and Nigeria	99.827	.028	.025	.065	.013	.022	.005
Wing Hong, No. 1	Hong Kong	China	99.343	.031	.040	.434	.007	.052	.010
Katanga†	Hoboken, Belgium	Belgian Congo	99.966	nil	.006	.012	Trace	.013	.003
Chempur†	Capper Pass & Sons Bristol, England	......	99.992	.003	nil	.0027	.0006	.0005	.0013

*The Metal Industry, vol. 50, No. 3, January 15, 1937, p. 91.
†Statistical Year Book, 1937, International Tin Research and Development Council.

Besides work sponsored by the International Tin Research and Development Council, various institutions and private laboratories throughout the country conduct research from time to time on specific problems relating to tin.

Although sources of tin are limited, ore reserves and possibilities of increasing tin ore resources are such that no immediate concern need be felt for an adequate world's supply of tin. Most authorities agree, however, that there is not much chance for greatly decreasing the cost of production, since the necessity for working leaner ores will probably at least counterbalance savings produced by engineering developments.

There is little chance that the United States can develop a tin-mining industry of any importance, but it is possible that a tin-smelting industry could be developed for part of the country's requirements, using imported ores, and, of course, domestic ores should any become available. Secondary recovery of tin is entirely effective, and there is not much chance of increasing the tin production from this source except as more scrap is produced. Recovery of tin from used containers can be done and is a potential source of tin if sufficient primary tin is not available and the price rises well above current levels.

The trend towards substitution of other materials for tin increases with rising cost of tin. Since the price of tin has been fairly well stabilized during the past few years, this tendency has not been operating strongly, and for the most part the consumption of tin has risen almost directly with rising industrial activity. For many purposes the cost of the tin is such a small proportion of the product cost that it does not pay to change to a substitute even if one is available. Research on tin is greater now than at any time in the past. New uses and increased consumption of tin in present uses are likely to develop. At the same time the greater knowledge of the properties and behavior of tin and its alloys and compounds that will result from these studies will aid in more firmly establishing tin in the positions for which it is most fitted.

Grateful acknowledgment is made by the author to Mr. D. J. MacNaughtan, Director of the International Tin Research and Development Council, for the opportunity of preparing and permission to publish this material.

Gas-Impermeable Fabrics

Ability of organic films to impede the passage of gases is important in connection with many modern products, particularly balloon and airship fabrics, where thin films and large surfaces are encountered. The tendency of hydrogen and helium to diffuse readily through rubber has been the incentive for the study of many film-forming materials. Among these the product resulting from the reaction between dichloroethane and sodium polysulfide has attracted particular interest, since it not only exhibits a high impedance to hydrogen, but possesses other desirable physical characteristics as well. A comprehensive study recently carried out by T. P. Sager, U. S. National Bureau of Standards, indicates that other products, resulting from the general reaction between organic dihalides, having —CH_2Cl terminals, and metallic polysulfides have the same relatively low permeability to hydrogen. Data given in *J. Res. Bur. Stand.*, August, 1937, indicate that the lowest permeabilities are obtained with products containing four sulfur atoms in the primary molecule. Comparison with films of natural rubber show that for both the disulfide and tetrasulfide derivatives, a much lower permeability is obtained with these products.

Joiner's Glue Specification

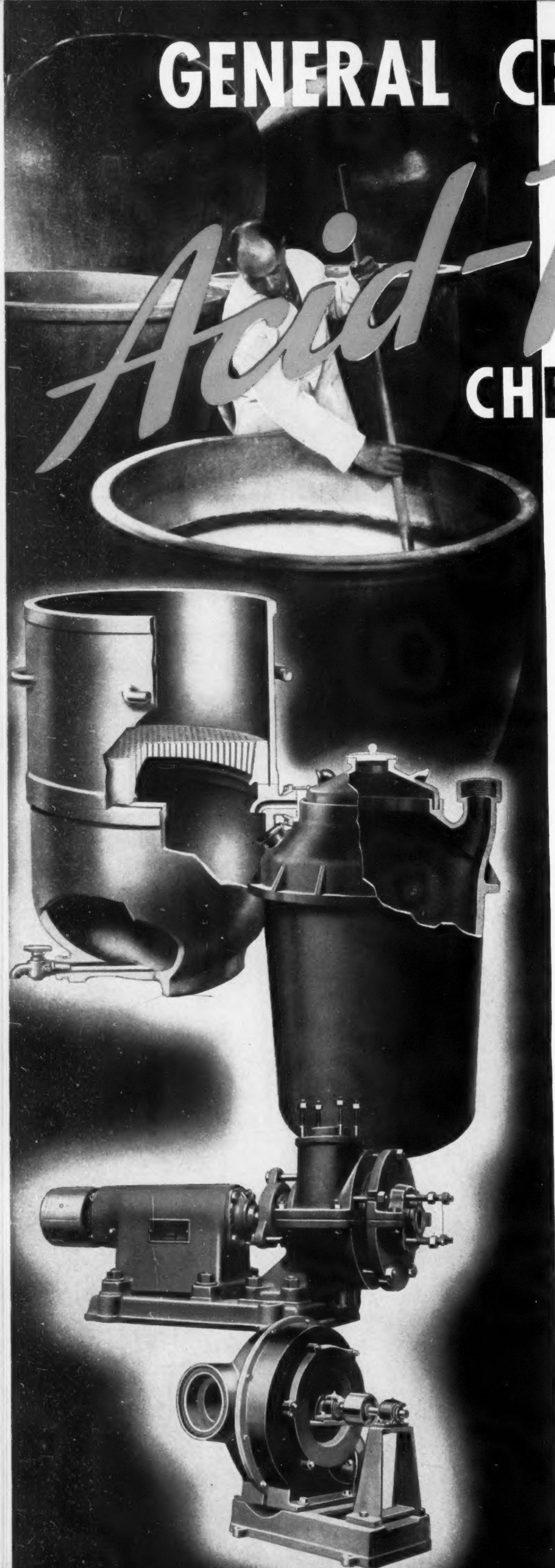
A new British standard specification (No. 745) has been published for "joiner's glue." It is one of a series dealing with glues, a specification on standard methods of testing glues (No. 647) having been published in 1935. These standards were authorized by the Chemical Divisional Council and prepared in co-operation with the industry. The present B.S. specifications cover various types of glue, as cake or powder, jelly or liquid, and casein glues, and include tests for the determination of moisture content, chlorine, reaction, and joint strength in shear. Copies may be obtained from the Publications Department, British Standards Institution, 28 Victoria Street, London, S.W.1, price 2s. 2d. post free.

Plant Operation

and Administration

Four coking drums, each 60 ft. long and 16 ft. in diameter, weighing 175,000 lbs., built by M. W. Kellogg Co., too big to ship by rail, steamer, or barge, were "sailed" from New York Bay, to Whiting, Ind., via Hudson River, N. Y. State Barge Canal, and the Great Lakes

A Digest of New Methods and Equipment for Chemical Makers



Measurement and Control of Process Variables in Chemical Equipment

CHEMICAL engineering operations, in practically all cases, involve the measurement and control of one or more variables which depend in number and type upon the complexity of the operation which is the object of the equipment. Various instruments are obtainable to measure these variables. These not only indicate when plant conditions are correct for efficient working; they also provide means for keeping the process safe against such hazards as fire, explosion, and the leakage of dangerous vapors.

Process variables can be measured, permanently recorded upon suitable charts, and also automatically controlled. The three groups of instruments are separately known as indicators, recorders or recording indicators, and controllers, various combinations of the three main functions being possible, such as an instrument which indicates and records, indicates and controls, or indicates, records and controls the variable which it measures.

The utility of the measurement and control of variables in the operation of chemical equipment cannot be valued too highly, because the use of an instrument avoids possible errors of judgment on the part of the man who is operating the equipment. Even a simple device, mechanically sound in design, is better than nothing at all for the purpose of regulating some particular variable, a typical instance being the rate at which liquid enters a vessel or the rate at which solid material passes to a grinding mill. On the other hand, it is quite easy for chemical equipment to be encumbered by the adoption of too many measuring and controlling devices. Just what process variables it is desirable to measure and control on certain equipment must be decided when the value of each of these variables has been carefully assessed; there are, of course, general cases where it is obvious that measurement and control is desirable, as with temperature in distillation processes or pressure, and also temperature, in the case of an autoclave. In the matter of selecting a suitable instrument, however, the potential user does not find it an easy task for he can be very much bewildered by the variety of instruments listed in catalogues and leaflets of makers. Not only do limitations apply to the use of certain patterns of instrument, but also many refinements in actual design and construction which greatly affect the accuracy of that instrument in a particular application—especially accuracy over a long period of use, with possible ill effects from particular sources of strain and shock to which the instrument may be subject in the course of carrying out its designed function.

Not every variable requires separate control, even though it be measured and indicated and possibly also recorded, because the adjustment of other conditions in combination may have the effect of holding it within desired limits. In a boiler which produces dry saturated steam, for example, control of the pressure will automatically provide for a supply of steam of a definite temperature, but to maintain the pressure, the rate at which heat is added to the boiler must be equal to the rate at which heat is withdrawn in the form of steam. In consequence, in addition to the regulation of pressure, the rate at which fuel, air (necessary for the combustion of the fuel) and water (as raw material for the making of the steam) are supplied must also be subject to control. If a particular variable is important for the operation of the equipment, its recording will be worth while irrespective of whether control is effected by manual or automatic means. An automatic controller becomes specially desirable if the variable is liable to fluctuate either widely or rapidly, and particularly in cases where any such fluctuation may affect the success of the process. Speaking generally, the true worth of automatic control by means of a group of instruments and operating devices must be assessed on a basis which is purely economic, and it must not be overlooked that as much may be overdone as left undone.

When the type of control has been settled, the specific method to be adopted comes up for consideration. Here the determining factor is mainly the balance of suitability against initial cost and upkeep. The chemical engineer is fortunate in that the available instruments cover a fairly broad range in their accuracy, reliability for keeping in good order, and cost. It is not always the most expensive instrument which is the most satisfactory in the long run, because a certain proportion of the cost may have been incurred by providing some minor technicality in design which may be very desirable in one case and yet of no advantage whatever in another. Where the failure of an instrument might be particularly hazardous it is desirable to install duplicate instruments; this is another reason for keeping an eye upon initial cost. Actually there are very few instruments on the market which can be really regarded as unsatisfactory in operation, because the making of instruments is a highly specialized job and the maker's reputation would quickly suffer if cheap and unsatisfactory instruments were placed on the market. Nevertheless, manufacturers do endeavor to provide instruments at slightly different prices to suit users whose purpose may be fulfilled quite well by omitting small refinements in construction, with sometimes very great saving in cost.

Value of Automatic Control

General increase in the output of chemical plants is now encouraging the wider use of a great variety of controlling devices, both automatic and semi-automatic, to make the process continuous. This continuous processing has two important advantages. It makes large scale production easy, and at the same time more or less guarantees that the output of the equipment will be uniform in quality—both in physical condition and in chemical composition. Where the flow of materials is rapid, however, the controlled conditions have to be especially exacting, and here is a typical instance where the measurement of variables must be particularly accurate and the instruments must be of the highest reliability against loss of accuracy or failure. Automatic control, as such, possesses several advantages from the point of view of processing, almost irrespective of what unit operations are involved. Measurement of variables is a question of detecting differences; the differences affect the quality of the product and the smoothness with which the process operates. It is the immediate response of the instruments to variations within the range of their operation which is the main advantage of installing automatic controllers and their accessory devices. Slight variations of temperature or pressure, for instance, may have important effects upon the output of the equipment, and in those cases where the adjustment of conditions is left to the man in charge it is always possible that he may not be quick enough to notice troubles until damage is done. This state of affairs is especially important where a continuous process is in operation. On the other hand, a controlling instrument will give immediate response to any changes and immediately compensates the trouble. Quick response to changes becomes especially important with increased speed of output, because, in a continuous process, variation from standard

Abstract from article by "Consultant," "The Chemical Age," Sept. 25, 1937, p. 247.

for one minute or less may produce sufficient "off-standard" material to "de-grade" a much larger batch of the ultimate product, in the manufacture of which the equipment in question may provide one unit operation.

Accuracy, of course, is the first essential of all indicating, recording and controlling instruments. The actual devices which are operated by the controller should be simple in design in order that they may respond quickly and to the degree required, and they should also be easy to adjust when the necessity arises. It is the small pilot valve which simplifies the task of keeping the flow of liquids and gases at a definite value, or in controlling the rate of flow of a liquid or gas in one pipe at some definite ratio with the rate of flow in another pipe, and for such a purpose as that of maintaining volume and liquid level in absorption towers and distilling columns.

Importance of Maintenance

If measuring instruments are to do what is intended of them they must be kept in good working order. They must be accurate and remain accurate, or their true purpose will be frustrated. If many instruments are installed it is wise to have their accuracy checked by the makers at regular intervals, a so-called servicing contract being made for the purpose of testing the instruments *in situ* on the equipment and adjusting them when occasion arises, or repairing them if necessary. The frequency of inspection should be left to the discretion of the makers of the instruments; in most cases one call every three months should suffice and is desirable. Such testing, of course, can be done by the user if there is someone sufficiently competent to do this and if apparatus is available, *i. e.*, apparatus for testing pressure gauges, a lead or salt bath for pyrometers, a tank for calibration of liquid flow meters, a pilot tube for flow of air and gases, and an anemometer for checking the air delivery from a fan. In any case it is desirable for the maintenance engineer to be acquainted with the nature and general construction of the instruments under his care. For this purpose users of instruments will find that their engineer will benefit by a visit to the maker's plant, where facilities will be readily given to see instruments manufactured and tested.

It is very desirable to have detailed advice from the makers of the instruments, and, with this advice kept in view, no person should touch an instrument except for any necessary maintenance work, and even then the person should be familiar with the installation of instruments. Inaccurate measuring and recording arise mainly as the result of tampering by inexperienced persons; one person should therefore be made responsible for all instruments which are installed at the works, whether a few or many, and this person should always have the task of removing charts when necessary and making any required adjustments.

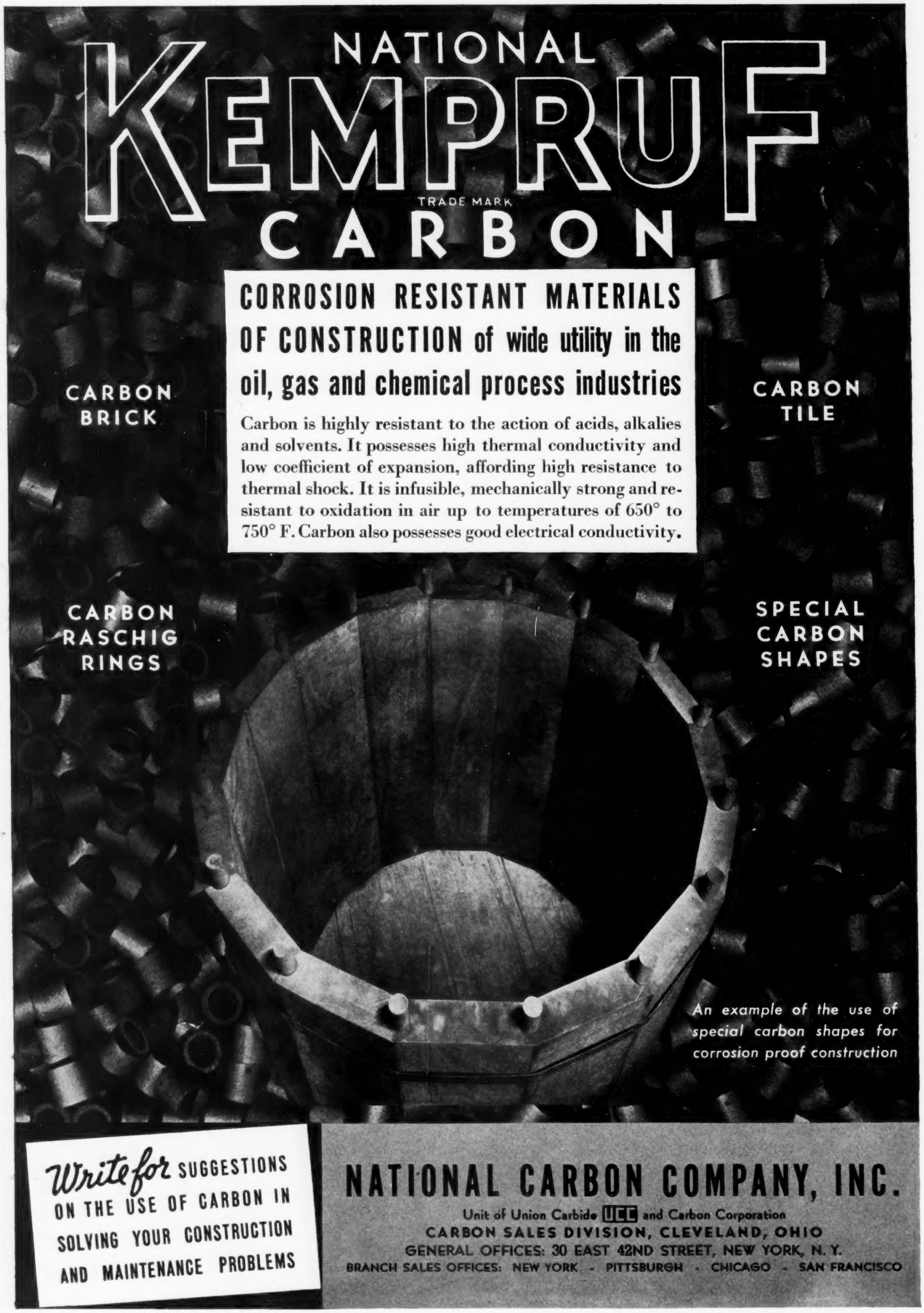
The most accessible place on the equipment is generally the most desirable for the installation of any instruments. In an accessible place they can be seen easily by the man in charge and the changing of charts or the making of adjustments is not hampered. At the same time the "accessible" position should be chosen carefully, for it is obvious that there should be no risk of damage to the instruments by the movement of process men, fitters, or by any portion of the equipment which may have to be hoisted in the course of repairs. Location should be as near as possible to the usual station of the man in charge, because he will then frequently consult the indicators and recording charts.

Charts from recording instruments should be examined and compared at regular intervals; only by doing this is it possible to make proper use of them. Comparisons should be made with records obtained on previous days and in previous years, and every variation should be investigated with the object of knowing why it occurred and whether a variation in one variable coincided with a change which is noticeable in one or more variables which are likewise recorded. Indicating and recording instruments provide facts, and these, collected over a long period of time, become a valuable asset for studying plant conditions.

Modern improvements in indicating, recording and controlling instruments have been mainly concerned with attaining greater accuracy, a greater degree of sensitivity or immediate response in use, and in the provision of patterns to meet special conditions of usage. In addition, there has been a noticeable trend to give data of different kinds upon one and the same chart in order to facilitate the study of that data. For instance, instruments which record two or more variables on one uniformly graduated chart —say pressure, water level, and rate of flow—are especially useful, because successful process operation depends upon the accurate and co-ordinated knowledge of the various factors involved. A quick comparison of fluid flow with such related factors as pressure, temperature, liquid level or ingress of air, as in the case of boiler plant operation, is always desirable; and no better example of the general use of control instruments exists than that which is provided in the case of a boiler producing dry, saturated steam. Multipoint and distant indicating instruments have also been more widely used.

As to the necessity for recording instruments, consider again the case of steam, where steam costs are important costs, and merely ask two questions: First, do you know what you are getting for these costs? Second, do you know where the steam is going and which parts of your plant are using it to its best advantage? Only by knowing this is it possible to make savings in the boiler house and in every steam-using unit at the works. Heat-using processes of any kind should always be recorded, preferably to show rate of flow so that the most efficient boiler operation is possible, and also to show steam flow in unit volumes, and the time at which it was produced or used at any part of a twenty-four hour period. In this way steam production and distribution can be effectively analyzed, and used in conjunction with temperature, pressure, liquid level, and other data, to give a coordinated and balanced system of process control.

The last few years have shown the ingenuity of the instrument designer in attempting to meet all the demands of providing a record of equipment process variables, and for controlling these variables. For instance, the number of industries which now depend upon an accurate and continuous knowledge of hydrogen ion concentration is very large, and here there is an ever increasing demand for a record of results and the automatic operation of valves and other devices to ensure uniform conditions. The continuous measurement and control of these *p*H values is obtained by electrical recording instruments which work on a potentiometric principle. These instruments are widely adopted for the reason that precise degrees of acidity or alkalinity can exert a marked effect upon the yield and quality of the product in so many processes of a chemical nature, which are distributed throughout different industries. A recording potentiometer, with automatic temperature compensating devices, can be arranged to control a valve for the addition of the correct amount of a particular solution which is necessary for processing. Photoelectric cells can be used to detect and also regulate devices which arrest turbidity or change of color, in cases where a solution may be so affected to the detriment of the ultimate product. Portable draught and pressure indicators are now obtainable for works where there are furnaces, retorts, flues, drying tunnels, and ducts which convey hot air to drying rooms. Boiler feed water is effectively and accurately measured by means of recorders in which the feed water passes over a V-shaped notch before entering the feed pump and so actuates a recording lever by the rise and fall of a float. There is, indeed, no limit to the number of cases which could be mentioned where recent invention has been applied to the design of measuring and controlling instruments.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Cleaning Oil Soaked Belting

Although oil does not damage some belts seriously an excessive amount of oil does cause slipping. As soon as slip occurs there is an unnecessary power loss which is directly proportional to the slip. For instance, if the slip amounts to 2 per cent. the power loss is 2 per cent. and the production loss is also 2 per cent. If the slip is 5 per cent., power and production losses are 5 per cent. In other words, percentage of power and production loss is identical with percentage of slip.

Continued use of a leather belt soaked in mineral oil will develop cracks from fiber abrasion inside. The natural animal oil in high grade leather protects these fibers against sawing one on the other. Harsh mineral oil removes this film of natural animal lubricant, and allows the fibers to contact and develop abrasion. Degreasing will remove the mineral oil and redressing with animal oil will replace the film on each fiber, which means pliability without internal damage.

Excessive slip may also cause burning of the belt, which is often more serious than the power loss, cracking, and abrasion combined, and can be surprisingly expensive. There are two general ways in which to tackle this problem:

First:—Improve your oil conditions if possible so that there will be no leakage or splattering of oil onto the belt. By so doing, it will not be necessary to give the belt a periodic cleaning.

Second:—Use a good belt that is as immune as possible to being harmed by oil and then clean it periodically.

Numerous cleaning agents are recommended for washing leather belts such as a mixture of petrol and turpentine; gasoline; naphtha; kerosene; benzol; carbon tetrachloride; aqua ammonia; alcohol; soda and water.

In general these rules may be followed: Immerse the loosely wound coil, on edge, in the liquid, and allow to soak overnight. Then stand on the other edge for 10 hours. If the belt is dirty in addition to being oil soaked, the dirt usually loosens and settles to the bottom. The dirt that does not loosen and settle can generally be removed with ease by brushing or scraping. To hasten drying the belt may be run through an ordinary washing wringer, provided the belt is not too wide. If too wide for a wringer, dry with a cloth.

A putty knife or similar broad scraping device having rounded corners is a good tool for scraping leather belts. Fibers of a belt, whether leather or substitute, must never be injured.

Place dry sawdust on the belt after laying the belt flat on the floor and clean with a stiff broom. Then turn the belt and do the same to the other side. After this pack the belt in powdered chalk, Fuller's earth, or fine sawdust and keep it in a warm place. The warmth improves capillary attraction and will aid the material in absorbing the oil. After the belt is dry lubricate it with a suitable dressing recommended by the manufacturer of the belt.

When using gasoline or naphtha be extremely careful. According to the U. S. Bureau of Mines if gasoline is stored in an open place, as in a pail, the room in which the pail is left will soon be filled with an easily explosible mixture. The limits of explosibility are between 1.5 per cent. and 6 per cent. of gasoline vapor in air. In other words, only a little gasoline vapor is needed to render air explosive—one and one-half cubic feet of gasoline vapor for each 97½ feet of air. One gallon of gasoline can, when perfectly mixed, render 2100 cubic feet of air explosive.

Some types of pulleys also collect oil and become "oil soaked." An oil soaked belt on oil soaked pulleys is a very poor combination for power transmission. Pulleys can be degreased as well as belts by a process very similar to that described above.

Sometimes hot irons are applied to belting to drive out the oil, blow torches are resorted to, or where available, steam is used. Steam is preferable to hot irons of course, but even with steam the utmost caution must always be exercised in its use. Steam is an excellent cleanser for many purposes, but it must be remembered that many kinds of belting cannot withstand the high temperatures that go with steam. The temperature of steam at atmospheric pressure is 212° F. The higher the steam pressure the higher the corresponding temperature.

212° F. is too hot for most rubber belting. One prominent rubber belt manufacturer states that his belting is not affected by heat up to a temperature of 200° F., and states that where higher temperatures are to be encountered he should first be consulted. That is good advice regardless of the kind of belt. Even where steel chains are used one must be careful in high temperatures or lubrication difficulties will be experienced. Of course steel chains can be cleaned safely with steam.

Balata belting is more sensitive to high temperatures than rubber. Its temperature should be kept down to less than 110° F. At 125° balata gum can be molded, therefore never heat balata belting in any way.

According to one authority oak tanned leather belting should not be subjected to a temperature higher than 115° F., which means, of course, that oak belting, also, must not be cleaned with steam. It cannot stand it.

Nor should impregnated cotton belting be cleaned with steam because the steam will very likely wash out the impregnating compound. Without the compound cotton belting does not give satisfactory results. Stitched canvas belting should not be used in temperatures higher than 140° F.

Waterproof leather belting of the special mineral tanned variety can safely be cleaned with low pressure steam as it is not harmed at 212° F. But be sure to replace the mineral oils which are almost certain to be driven out. Unless the belt is treated after steam cleaning in accordance with the directions of the manufacturer the fibers will be left dry and brittle and failure thereafter may be premature. From an article by W. F. Schaphorst, *Manufacturers Record*, Sept., 1937, p.80.

Paint Standards for Machinery

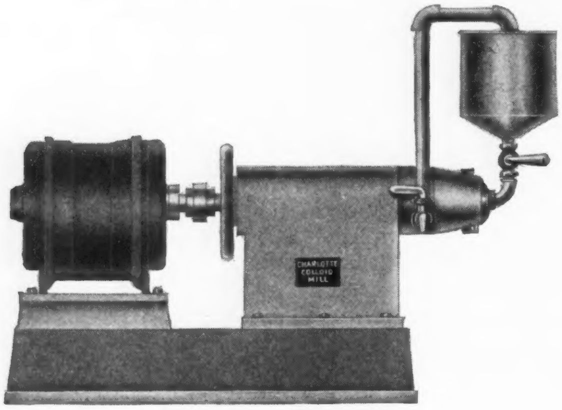
Considerable experimentation to determine the best colors of paint for use on machinery has resulted in a decision by the German Standards Committee to use a blue gray color for painting all types of stationary machines for factories. This color has been found most suitable for protection against dust and grease, besides it is most agreeable to the eyes of workmen engaged in factories. (Vice Consul C. J. Zawadski, Breslau).

Sodium Metaphosphate Purification

A modified process for purifying sodium metaphosphate, or any of its polymers, especially when made from phosphoric acid containing iron, aluminum, vanadium, chromium, etc., as impurities, is the subject of E. P. 469,704, granted to Rumford Chemical Works, Rumford, R. I. Process recommends adding to a solution of the metaphosphate, a soluble alkaline compound, then filtering off resulting precipitate. Preferably the soluble alkaline compound is added in an amount slightly in excess of that required to eliminate the impurity, but not in sufficient quantity to re-dissolve any precipitated aluminum compound. Preferred alkali compound is sodium hydroxide.

The impure sodium metaphosphate is dissolved in proportion of 1 part by weight of metaphosphate to 4 parts by weight of water. To this water solution is then added from 0.05 to 0.15 parts, but preferably 10 per cent., by weight of sodium hydroxide as compared with the metaphosphate. On cooling the filtrate, a metaphosphate which has a slight alkaline reaction is obtained. This alkalinity does not interfere with the industrial uses of the metaphosphate, but is claimed to be an advantage, not only because the alkalinity is more satisfactory and economical for softening water, but because the dry compound is more readily soluble in water.

THE CHARLOTTE COLLOID MILL



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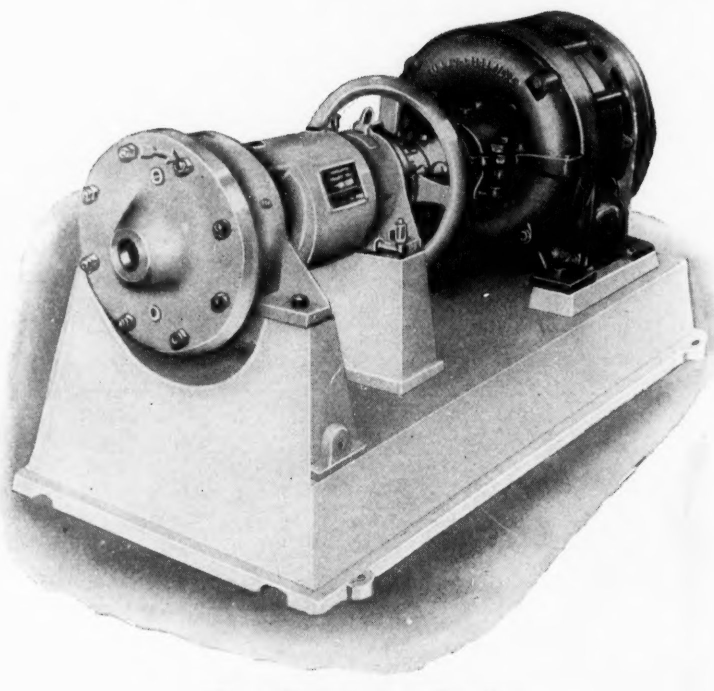

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Aniline Safety Precautions

National Safety Council cautions users that all rooms in which aniline is stored or handled should be well ventilated Where possible it should be handled in closed receptacles fitted with tightly fitting covers. Workroom floors should not be of asphalt, tar, or other porous materials, as these àbsorb aniline if spilled thereon.

Aniline oil is readily absorbed by the unbroken skin and mucous membranes; and poisoning by absorption may occur when liquid is spilled on clothing, by inhalation of fumes, and by swallowing liquid mixed with dust, saliva, or food. The following precautions are recommended:

A supply of vinegar or 3 per cent. acetic acid should be kept at hand for use when aniline has been spilled on the skin. In cases of acute aniline poisoning, patient should be removed to the fresh air and given a mild stimulant such as strong black coffee. If he has swallowed aniline, he may, if conscious, be given one ounce of glucose in water alkalized with sodium bicarbonate. If he is unconscious, artificial respiration should be started immediately. Under no circumstances should alcoholic stimulants be given, and a doctor should always be summoned.

If aniline has been spilled on the clothing, immediately remove patient to a warm place, where he will have plenty of fresh air. His clothing should be removed, and after the excess of aniline has been sponged from his body with soapy water, he should be bathed with vinegar. Care should be taken to see that aniline fumes are not breathed by the patient or by those attending him.

Electrolytic Sodium Sulfide

Use of alkali metal amalgams in manufacture of alkali metal sulfides is detailed in E. P. 470,033, granted to Luigi Achille, Milan, Italy. An alkali metal chloride is subjected to electrolysis, using a mercury cathode, the resulting amalgam being brought into contact with sulfur or with sulfur dissolved in an alkali metal sulfide solution. *Chemical Trade Journal*, Sept. 10, '37, p. 226.

Inexpensive Production Liquid Hydrogen

F. G. Keyes, H. T. Gerry and J. F. G. Hicks, Jr. (*J. Amer. Chem. Soc.*, 1937, *59*, 1,426) briefly describe a hydrogen liquefying system which depends upon commercial electrolytic hydrogen as the source of high pressure gas and which involves the use of metal dewars, improved means of thermal isolation and heat exchange, and a means for producing lower fore-temperatures in the form of a charcoal desorption unit. The theory of liquefaction by the use of the Joule-Thomson effect is discussed, and some improvements in the interchanger-liquefier, together with a proposed procedure for lowering the fore-temperature of hydrogen entering the liquefier, are described. It is shown that it is possible to produce liquid hydrogen wherever tanks of compressed hydrogen are available by using equipment which can be fabricated inexpensively. A source of liquid air, preferably liquid nitrogen, is, of course, required.

Electro-synthetic Production Formaldehyde

Experiments on production of formaldehyde from mixtures of hydrogen and CO by methods involving use of catalysts and high pressures have not, so far, produced promising results, but it is possible that greater success may attend the reaction if carried out at low pressures and under influence of an electrical discharge. Research in this line, conducted by Usines de Melle, Deux Sevres, France, has been published and is covered by E. P. 469,371 (*Chemical Trade Journal*, Aug. 27, '37, p. 182). Invention is stated as consisting essentially in effecting the electro-synthesis of formaldehyde from carbon monoxide and hydrogen under influence of anodic light (which appears at the low pressures used) or alternatively at a gas pressure of less than 0.15 atmosphere.

Manufacture Sulfuric Acid

Complete removal of arsenic trioxide from the initial gases for the manufacture of sulfuric acid with a platinum catalyst, is described by Adadurov, Zeitlin, and Fomicheva (*J. Appl. Chem.* (*U.S.S.R.*), 1937, *10*, 5, 807-820). The gases are passed through copper oxide and manganese dioxide, which catalyzes the oxidation of volatile arsenic trioxide to non-volatile pentoxide, which remains on the catalyst. By adjustment of the quantity of catalyst, and the rates of flow of the gases, 100 per cent. removal of As_2O_3 can be attained, and thus all danger of poisoning of the platinum from this source, avoided. At high rates of flow, the activity of the $CuO.MnO_2$ must be increased by the addition of small quantities of cobalt oxide, beryllium oxide or silica.

The catalyst becomes exhausted when it has converted about 10 per cent. of its own weight of As_2O_3, due to coating of its surface with As_2O_5, and it must then be washed with a 15 per cent. solution of KOH (this was found to be better than NaOH), in order to dissolve the As_2O_5 (which can be recovered by precipitation as valuable calcium arsenate with lime). This treatment completely restores the activity of the agent. *Chemical Age*, Aug. 21, '37, p. 160.

Purification Zinc Sulfate

Use of ozonized air for purification of zinc sulfate solutions for use in the manufacture of electrolytic zinc or lithopone was suggested by Vodret and Gallo to a chemical congress held in Sardinia some time ago and reported in the *Chemical Trade Journal*, Aug. 27, '37, p. 184. Their method comprises treatment for thirty minutes with ozonized air of the liquor produced by the attack of sulfuric acid on roasted zinc mineral, followed by the addition of calcium carbonate. Solution after filtration is free from all foreign heavy metals. When used for the electro-deposition of zinc, the solution purified by the ozone method gives deposits much superior to those formed when working with solutions purified by the usual chemical methods.

Sulfuric Catalyst

A mixture of the sulfates of magnesium, aluminum, and iron is used as a support for a platinum catalyst in sulfuric acid manufacture, according to E. P. 466,721, issued to I. C. I., Ltd., London. The magnesium sulfate should predominate and may comprise 75 per cent. of mixture.

Improved Copper Catalyst

The characteristics of an improved form of copper catalyst, recently described by Griffith (*Trans. Faraday Soc.*, 1937, *33*, 412) have been studied by Taylor and Joris (*Bull Soc. Chim. Belg.*, 1937, *46*, 6, 241.).

Copper and magnesium hydroxides were precipitated from a solution of their nitrates with caustic soda, the CuO : MgO ratio in the precipitate being 1 : 5. After washing and drying, the copper hydroxide was reduced to metal in a stream of hydrogen at 200° C., for 5-6 hours. The brownish-red powder thus obtained retained its activity for the hydrogenation of ethylene unimpaired after heating to 560° C., whereas an unsupported catalyst would lose its activity after heating at 460° C.

With the new catalyst, the hydrogenation of ethylene to ethane proceeded very rapidly at 0-40° C., the rate of reaction increasing with the temperature in this range. Similarly, rapid conversion of benzene to cyclohexane was produced at an optimum temperature of 225°, an efficiency of 64 per cent. being obtained when 6.5 cc. per minute were passed over a quantity of catalyst containing 0.75 g. of copper. Ethylene or benzene in excess acted as poisons, slowing down the respective reactions. Dehydrogenation of cyclohexane was also accomplished with an efficiency of 24-37 per cent. between 400° and 460° C., no cracking occurring. *Chemical Age*, Sept. 4, '37, p. 196.

New Equipment

Perpetual Desiccant

For the control of humidity in balance cases and cases for precision apparatus such as microscopes, optical, surgical and medical instruments a device, known as the Actigel Desiccator, is being manufactured by the Acticarbone Corp., Lincoln Bldg., New York City. It consists of cartridge charged with an inert, non-corrosive, non-deliquescent absorbent, enough to keep air dry in a receptacle with a volume up to 200,000 cubic centi-

meters at room temperature. Tel-Tale Spot in center of cartridge is normally blue. When regeneration is needed, it becomes pink; this can be secured by placing item in oven at 150° C. The cartridge comes in metal container with easy-opening device. Item is also useful in the home to maintain the condition of chocolates, crackers, sugar, salt and other moisture absorbing food products. It will be sold through laboratory supply houses.

New Line of Blenders

Patterson Foundry & Machine, East Liverpool, Ohio, is marketing a complete line of Blenders for use in oil refineries and in chemical process plants, for which unusual efficiency is claimed. They are suitable for speedy, uniform blending of asphalt cut-backs, oils, etc.

Non-breakable, Floating Thermometer

A non-breakable, floating thermometer, for measuring temperatures of hot liquids, called the "Thermosphere," is announced by Raytheon Mfg. Co., Waltham, Mass. Company claims for it many industrial applications, and describes it as a small metal ball with the temperature scale on the outside.

High Voltage, Explosion-proof Linestarters

Designed primarily to meet the requirements of the petroleum and chemical industries and other hazardous applications, high voltage type DNO linestarters being manufactured by Westinghouse, East Pittsburgh, Pa., are completely oil immersed and corrosion resisting with high interrupting capacity. For starting squirrel-cage and wound rotor induction motors, these linestarters are available for 2200 or 4600 volt service. For three pole, 60, 50, 40 or 25 cycle power their maximum ratings are 700 horse-power for 2200 volts and 1250 horse-power for 4600 volts.

Laboratory Model Colloid Mill

Model No. 005 Charlotte Colloid Mill, new laboratory model, which is an entirely new development from a mechanical standpoint and a vast improvement in horizontal mills, is announced by Chemicolloid Laboratories, Inc., 44 Whitehall St., New York City. New model has no stuffing box, therefore does not employ packing, thus eliminating a great deal of friction and permitting much smoother operation. Other features have been added to make this model more convenient to operate. Visitors at the coming Exposition of Chemical Industries, Grand Central Palace, will find one on display at Booth 237.

New Alloys for Cutting Tools

An improvement in development of metal tools, capable of cutting at increased speed and without any sacrifice of feed or depth of cut, has been made possible through new, patented cobalt-chromium-tungsten alloy, known as "Haynes Stellite-2400," product of Haynes Stellite Co., Kokomo, Ind.

Portable Recording Thermometer

A useful instrument for users of travelling ovens, finishing and enameling ovens, etc., is the portable recording thermometer recently developed by Bristol Co., Waterbury, Conn. Instrument passes through the oven on the conveyor with the "work" and gives a continuous record of temperatures to which the heated product is subjected as it passes through the oven.

Two-element Feed-water Control

A two-element steam-flow type of boiler feed water controller, known as the Copes "Flowmatic" Regulator, is being manufactured by Northern Equipment Co., Erie, Pa., for modern high-rating boilers and other units subjected to rapid, wide load fluctuations. It feeds the boiler according to the rate of steam flow, so that a higher water level can be provided on heavy loads than on light, or a practically constant level can be maintained for all ratings.

Air Valves

Recent addition to W. H. Nicholson & Co.'s several lines of control valves for all pressures and mediums is the model illustrated, designated Style J, a low-priced, non-leaking valve in three and four way types, for operating single and double-acting cylinders utilizing air or oil on pressures to 125 lbs. It is made in ¼, ⅜, ½, and ¾ inch sizes, of flat disc, protected seat design, with bodies and seats of semi-steel, discs of bronze. Company is located at 210 Oregon St., Wilkes-Barre, Pa.

Tape Sealer Attachments

New tape sealer attachments used in connection with a Union Special sewing machine head and for closing tops of open mouth multi-wall paper bags and textile bags are announced by Bemis Bro. Bag Co., 601 So. 4th St., St. Louis, Mo. These attachments incorporate a reel and holder for the tape, taping attachment, and the Bemis automatic tape clipper. The tape cutter operated by the filled bag itself is designed so it may be attached directly to the sewing machine sub-base. The clipper is solenoid operated. In using the bag holder the operator only makes two motions.

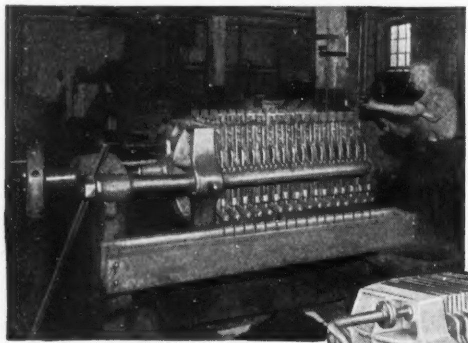
Aluminum Portable Typhoon Mixer

This new, light-weight machine illustrated on cover of New Products & Processes insert, is built in sizes from ⅛ to 5 H. P., and is obtainable for use with electric current of almost any characteristics. Unit is built by Patterson Foundry & Machine Co., East Liverpool, O.

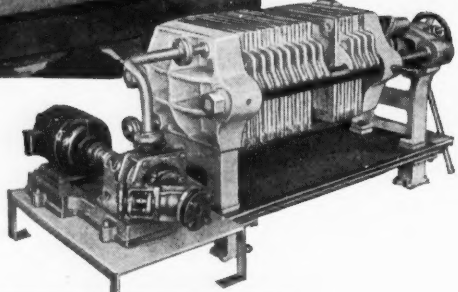
Direct Savings *through Modernized Filtration*

Whether you filter for the recovery of solids or the clarification of liquids—no matter what the operating conditions peculiar to your process and material may be—it is very possible that a direct savings may be effected through modernization of your filtration methods.

In many industries a survey by Sperry engineers has resulted in the development of more economical filtration equipment, with accompanying savings that have paid for the original expenditure many times over.



A Sperry press developed exclusively for filtering dye, providing consistent service combined with minimum operating expense.



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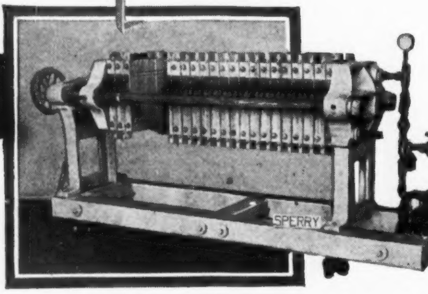

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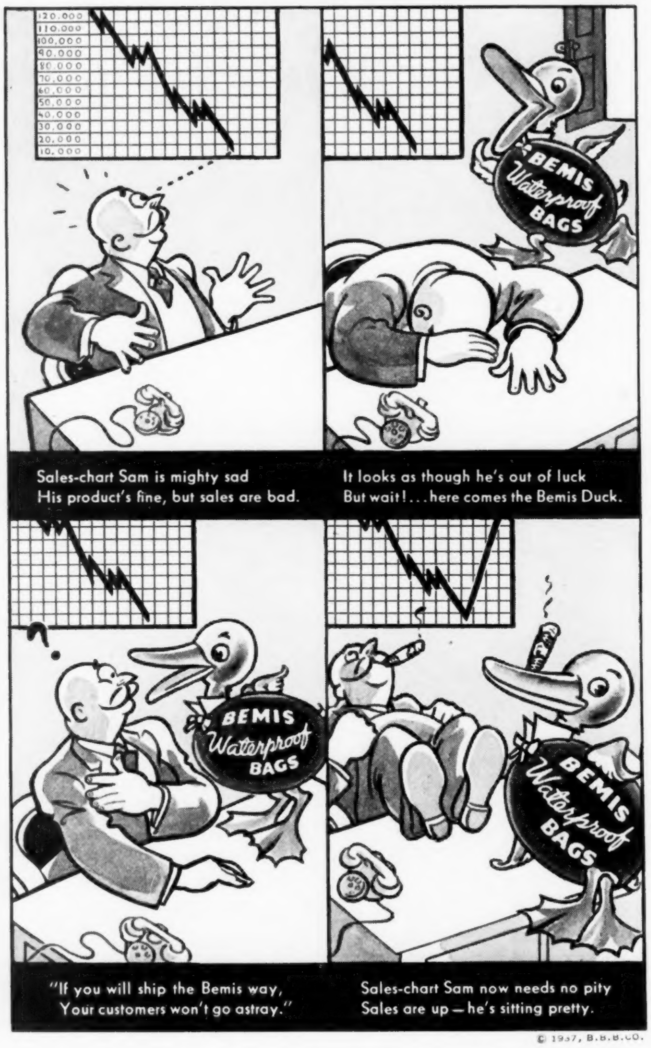

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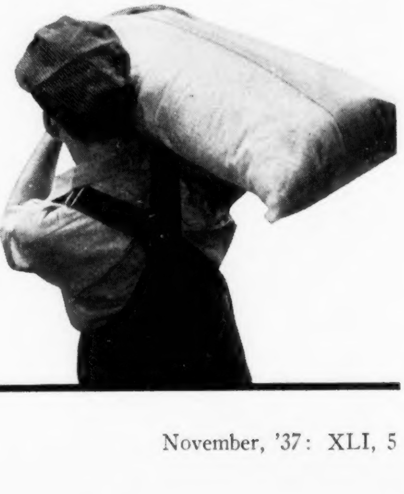

Booklets & Catalogs

Companies whose booklets are reviewed on this page will be glad to supply readers of "Chemical Industries" with copies free, provided this magazine is mentioned and the request is made on company stationery. Your business title should also be given.

The Alloy Pot, Vol. 5, No. 5, Metal Show Issue, contains diversified collection of impressive data on outstanding progress made by die casting industry during past year. New Jersey Zinc Co., 160 Front st., New York City.

Binocular Microscopes, Greenough Type, Catalog D-15, descriptions, specifications, illustrations, and prices. Bausch & Lomb Optical Co., Rochester, N. Y.

Chemical Calculator for writing chemical formulas quickly, and **Trigonograph**, trigonometric and numerical quick calculator and function table, leaflet, lists new reduced prices. Chemical Rubber Co., 1900 W. 112 st., Cleveland, O.

Compressed Air Filters, Type T R, Bulletin 102, application, uses, advantages, specifications, prices, illustrations. R. P. Adams Co., 220 Delaware ave., Buffalo, N. Y.

Cornstalk Acoustical Board, Bulletin No. 137, by L. K. Arnold, H. J. Plagge, and D. E. Anderson, describes apparatus for determining coefficients of sound absorption of acoustical boards; effect of composition of pulp used, and surface treatment given boards tested are discussed. Iowa Engineering Experiment Station, Iowa State College, Ames, Iowa.

Electromet Review, November, 1937, digest of developments in electro metallurgical field, presented in quickly readable form. Electro Metallurgical Co., 30 E. 42nd st., New York City.

Evactors, Catalog No. 103, deals with steam jet vacuum equipment from technical and practical angles; comparison with other types of vacuum producers is given; also useful charts and curves. Croll-Reynolds Co., 17 John st., New York City.

Flexrock, folder, flexible concrete for washroom floors, service station inside floors, lobbies, corridors, school rooms, and other such places over old wood floors. Flexrock Co., 800 N. Delaware ave., Phila., Pa.

Flintcrust, leaflet, describes product for prevention rough, worn, and broken concrete floors; illustrates everyday occurrences which can be prevented through its use. Flexrock Co., 800 N. Delaware ave., Phila., Pa.

Glass Color Filters, booklet, resume of Corning line, classifications, tables, and spectrophotometric curves; price list included. Corning Glass Works, Corning, N. Y.

Heating Corrosive Liquids, Bulletin No. 42, information on company's equipment in this line; diagrams of pipework connection details; graphs, and other useful data on methods used in various process industries. Heil & Co., 3088 W. 106th st., Cleveland, O.

Heating and Heat Treatment of Metals, handsomely illustrated brochure, traces heredity of metals, and subsequent applications of heat from the ingot soaking pit to the last phases in which heat is applied to the metal; briefly describes and illustrates a few typical furnaces. Surface Combustion Corp., Toledo, O.

H-O-H Lighthouse, Vol. IV, No. 5, feature article deals with control and operation of water chain systems. D. W. Haering & Co., Inc., 3408 Monroe st., Chicago, Ill.

Industrial Tire Handbook, 30 pp., how to save money on intra-plant and industrial hauling, lower costs and speed up plant operations, by use of rubber-tired wheels on material handling equipment, complete with data, charts and specifications. B. F. Goodrich Co., Akron, O.

Insulbrix, leaflet, briefly describes low heat storage insulating fire brick for direct or indirect exposure to flame and furnace gases in boiler and other furnaces, ovens, and kilns; lists also specifications. Quigley Co., 56 W. 45th st., New York City.

Laboratory Coats and Aprons, descriptions, specifications, and prices. Chemical Rubber Co., 1900 W. 112th st., Cleveland, O.

The Laboratory, October, 1937, house organ of special interest to users of laboratory equipment; describes new laboratory aids; features historic article on "Roger Bacon-Dr. Mirabilis." Fisher Scientific Co., Pittsburgh, Pa.

Link-Belt News, October, 1937, monthly highlights of news and developments in conveying and power transmitting machinery field. Link-Belt Co., 2410 W. 18th st., Chicago, Ill.

Machines and Working Hours, booklet, sixth in series on relation of machinery to American standard of living, graphical facts on mechanization and working hours, published with aim of establishing a more sound understanding of this subject. Machinery and Allied Products Institute, 221 No. La Salle st., Chicago.

Micabond, catalog, clear, definite information on manufacture, uses, dielectric properties, sizes, and specifications of this bonded mica insulating material; unusually good photographs complete description. Continental-Diamond Fibre Co., Newark, Del.

Millite Lighting Unit, Catalog Section 61-166, describes use in extreme service conditions in industrial plants; includes dimension outlines, list prices, and light distribution data for various spacing and mounting heights. Lighting Division, Westinghouse Electric & Mfg. Co., Cleveland, O.

The Moly Matrix, September, 1937, issue devoted to discussion on "Low Temperature Impact Properties of Molybdenum Steel," supplemented by tables and charts. Climax Molybdenum Co., 500 Fifth ave., New York City.

Nickel Steel Topics, October, 1937, newer adaptations in growing field for nickel steel. International Nickel Co., 67 Wall st., New York City.

Outdoor Lacquer No. 4917, brass and silver lacquer for outdoor exposure, leaflet, summary properties, uses and tests. Roxalin Flexible Lacquer Co., Elizabeth, N. J.

Porous Stone Water Filters, Type W-F, Bulletin 601, general application covers broad field between sand filter and mechanical coarse strainers; construction and advantages described; specifications, and illustrations given. R. P. Adams Co., 220 Delaware ave., Buffalo, N. Y.

Preventing Welding and Cutting Fires, booklet, important part of nation-wide program to promote safe practices among users of industrial equipment; includes rules for prevention, besides other pertinent information. Linde Air Products Co., 205 E. 42nd st., New York City.

Ruggedwear Resurfacer, booklet, new material for quick, permanent floor repairs, in service over week-end; useful not only for patching concrete but for entire floors and for floors under heavy trucking conditions. Flexrock Co., 800 No. Delaware ave., Phila., Pa.

Studies on Insulating Board Production, Bulletin No. 136, by O. R. Sweeney and L. K. Arnold, tells of new forming machine, newer methods of pulp preparation, and studies of drying, sizing, air infiltration and dusting of board. Iowa Engineering Experiment Station, Iowa State College, Ames, Iowa.

Tarnish-proof Lacquer No. 4527, high mar resistant finish for brass and silver, leaflet, gives complete description, uses, properties and tests. Roxalin Flexible Lacquer Co., Elizabeth, N. J.

Temperature Recorders and Controllers, for furnaces, kilns, and industrial ovens, Bulletin 462, complete description and information. Bristol Co., Waterbury, Conn.

Vapocarb-Hump and Homo Furnaces, Broadside T, covers for first time, in a single publication, company's unusual line of furnaces for heat-treating tools, dies and production parts; of interest to heat-treaters, metallurgists, and industrial executives. Leeds & Northrup Co., 4934 Stenton ave., Phila., Pa.

Wrought Iron for Tank Construction, technical bulletin, helpful to those responsible for selection of proper metal for tank construction; 42 illustrations and descriptions of installations round out data. A. M. Byers Co., Pittsburgh, Pa.

Equipment News

H. McE. Patton, formerly Pittsburgh Steel, recently joined staff of Research and Development Division, Jones & Laughlin, Pittsburgh.

Koppers Co.'s Western Gas Division, Ft. Wayne, Ind., has placed Robert Bischoff, hydraulic engineer, in charge of all valve engineering.

Lehigh University, at its Founder's Day exercises, conferred the honorary degree of Doctor of Engineering upon E. G. Bailey, Vice-President, Babcock & Wilcox, New York, and President, Bailey Meter Co., Cleveland, for "notable and distinguished accomplishment in the field of combustion and steam engineering." In 1930 Mr. Bailey was awarded the Longstreth Medal by Franklin Institute, and in 1936 the Lamme Medal by Ohio State University.

Babcock & Wilcox Tube has appointed Edward D. Emerson, formerly Jones & Laughlin and Air Reduction Sales, as New York Manager Domestic and Export Sales. Bruce M. Jones has been transferred from Beaver Falls to the New York office.

Link-Belt board of directors at recent quarterly meeting elected two new vice presidents, William C. Carter and Edward J. Burnell.

George H. Corliss, four years advertising and sales promotion manager, Lewis-Shepard, Boston, has been made company's regional manager, with headquarters at 1401 Santa Fe Ave., Los Angeles.

Appointment of J. A. Schallenberg as Assistant Comptroller by Worthington Pump & Machinery Corp. rounds out a service record to that corporation of twenty years served in various capacities in the Treasury and Accounting Depts.

Alexander W. Limont, Jr., recently appointed manager, Compressed Division, Sullivan Machinery, Michigan City, Ind., comes to that company from the du Pont organization with whom he was associated for nine years.

Vacuum Systems, Inc., Cleveland, who recently acquired the assets, exclusive manufacturing rights, etc., of Crescent Pump Co., Detroit, will conduct the business at Cleveland.

Patterson Foundry, East Liverpool, O., announces that E. S. Boston has been made district sales manager with headquarters at St. Louis. He will have charge of the territory adjacent to St. Louis.


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There is no better evidence of industry's confidence in Diamond Quality Alkalies than the train-load shipments that leave the Diamond Alkali Plants at Painesville, Ohio day in and day out —month in and month out to meet the nation-wide demand for Diamond Brand everywhere.
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New Products and Processes

A Digest of Chemical Uses and U.S. Patents

Movie queen helps sell chemical apparatus. Miss Gladys George demonstrating ease of portability of the Patterson Aluminum Portable Typhoon Mixer, see page 473

Fatty Alcohols and their Derivatives

By A. H. Prevost

THE term "fatty alcohol" is by no means a perfect name for this new interesting class of substances. While justifying the name "alcohol," they are a long way removed from methyl, ethyl and propyl alcohols, so widely known and used in commerce. When it is remembered how closely related chemically are acetic acid and ethyl alcohol, it seems curious that palmitic acid and cetyl alcohol bear no close relationship to each other. Yet the process of reduction which changes acetic acid into ethyl alcohol is equally applicable to palmitic acid. Thus by reduction with hydrogen one oxygen is replaced by two hydrogens in the carboxylic group:

$$\underset{\text{Palmitic Acid}}{C_{15}H_{31}COOH} + 4H = \underset{\text{Cetyl Alcohol}}{C_{15}H_{31}.CH_2} + H_2O$$

If lauric acid is treated in the same way, a C_{12} alcohol, lauryl or dodecyl, is obtained.

$$C_{11}H_{23}COOH + 4H = C_{11}H_{23}CH_2OH + H_2O$$

With acetic and propionic acids the same kind of result is obtained.

The technical interest in the alcohols is not entirely confined to the alcohol group, but is centered rather in the alcohol radicle. Just as ethyl alcohol may be used to prepare ethylamine $C_2H_5.HH_2$ or ethyl mercaptan $C_2H_5.SH$ with innumerable uses in chemical synthesis, so may the fatty alcohols be used in synthesis as amines, mercaptans and so forth. In the literature of wetting agents frequent mention is made of dodecylamine $C_{12}H_{25}NH_2$ and dodecyl mercaptan $C_{12}H_{25}SH$. Thus it so seems that the term fatty alcohol may be interpreted in a very wide sense and that it is not limited to the use of cetyl or lauryl alcohol, in face creams or for softening rayon, for example.

Although fatty acids have been known for scores of years, it was not until the fatty alcohols were prepared commercially that wetting agents, dispersing and cation-active bodies became possible. In relation to the over-all size of the molecule, the change from COOH to CH_2OH is small in proportion.

Fatty Alcohol Uses

The fatty alcohols are, comparatively speaking, newcomers in commerce and their properties have not yet been fully explored. Cetyl alcohol $C_{16}H_{33}OH$ appears to have interested pharmaceutical chemists and makers of cosmetic specialties. Its presence lends smoothness to a face, hand, shaving cream or lipstick in comparatively small percentages.

It would appear at the present time that rayon manufacture is one of the most promising outlets for the fatty alcohols industrially. Thus, Imperial Chemical Industries, Ltd., now markets a mixture of long chain alcohols under a proprietary name in the form of an aqueous emulsion. The product is a white cream which emulsifies readily in water. Applied to rayon, such an emulsion endows it with softness, while in the case of cellulose acetate, alcohols reduce its tendency to become electrically charged in weaving or drying. The fatty alcohols have one very useful quality which appeals to all textile finishers and makers of fabrics, they do not discolor or turn rancid on the goods.

Since the fatty alcohols are practically insoluble in water, the methods of their application to rayon differ considerably. One suggestion is to mix the alcohol with the solution of cellulose ester prior to spinning and forming the filaments. In this way the softener becomes intimately mixed with the material of the fibre and is to all intents and purposes permanent. It is stated that the feel of such modified filaments is improved thereby. There are great possibilities in the foregoing method of introducing the fatty alcohol prior to formation of the filament and British Celanese, Ltd., have found that it makes textile materials more amenable to dyeing, has a lubricating effect and improves flexibility in the case of films of cellulose derivatives. There seems to be general approval of cetyl and octadecyl alcohols as modifiers by this method. According to a recent Canadian invention cellulose acetate containing 10 per cent. of cetyl alcohol, introduced before spinning, gives a yarn which knits more clearly, dyes 20 per cent. faster and is more readily delustred. Another and entirely different plan for dressing cellulosic materials with fatty alcohols is to displace first the water absorbed in the fibres by treatment with an alcohol such as ethyl, propyl or butyl. Subsequently the material is immersed in an alcoholic solution of the fatty alcohols.

It should be noted that in addition to their use in cosmetic preparations and in rayon finishing, the use of fatty alcohols as super-fatting agents in soap has been patented. No tendency towards rancidity is produced (B.P. 424,283). Fatty alcohols as foam preventers are also the subject of another patent (B.P. 429,423).

Sulfated Fatty Alcohols

The fatty alcohols are better known in the sulfated form than as the alcohols simply. When fatty alcohols are treated with sulfuric acid at 100° C. or with chlorsulfonic acid in the cold, the — OH group is esterified. The strength of acid used and the conditions obtaining are a matter of great importance. When formed the alcohol-sulfuric acid ester is neutralized with soda before being placed on the market. The sodium salt of lauryl sulfuric ester (plus esters of other alcohols) is a yellowish powder. It dissolves readily in water to give an opalescent, foaming solution. The commercial brands usually contain as much as 50 per cent. sodium sulfate which is considered to act ionically and enhance the detergent effect. Many sulfated fatty alcohol products react slightly acid towards litmus.

It will be obvious that there are possibly as many different alcohol esters as there are different fatty acids. Just as palmitic acid, which is fully saturated, gives cetyl alcohol convertible to cetyl sodium sulfate, so there is an ester corresponding to oleic and other unsaturated acids. Some workers have stated that the sulfates of unsaturated alcohols possess higher detergent power than those of saturated alcohols.

The following directions indicate how the sulfate of olein alcohol may be prepared. One hundred parts of olein alcohol are run into 70 to 100 parts of sulfuric acid at a temperature below 6° C. The mixture is allowed to remain for four hours, is neutralized and evaporated in vacuo. The product is a soft soap-like material stable to hard water.

Other Interesting Derivatives

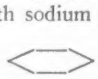
The sulfuric ester is not the only useful type of fatty alcohol derivative known, although at the present time it is undoubtedly the most common. A fatty alcohol or mixture of alcohols may be esterified in a number of ways, for example, with pyrophosphoric acid. According to H. Th. Böhme A.-G., such esters possess better washing properties than the corresponding sulfates. Another alternative is the thio-sulfuric ester, proposed by Henkel et Cie. Dodecyl thio-sulfuric ester is suitable for the washing of cotton but may also be used as a foaming, impregnating, stabilizing or equalizing agent or as a soap substitute.

The treatment of a fatty alcohol with chlorine has the effect of lowering the melting point while subsequent sulfation of the chlorinated alcohol gives a sulfuric ester whose solubility is

increased without at the same time impairing the wetting power. Naturally, only saturated fatty alcohols are referred to. For example, cetyl alcohol takes up chlorine when treated with the gas in carbon tetrachloride. If the latter solvent is removed and the chlorinated fatty alcohol be sulfonated, a useful wetting and cleansing agent is obtained. For example, it may be employed in pulling wool, washing soiled white textile goods, sizing worsted warps and cotton in conjunction with starch, for dressing and finishing, and in connection with blacking and dyeing.

Fatty Alcohol Mercaptans

The fatty alcohol mercaptans have proved a fruitful field of technical research and so many interesting compounds containing carbon direct linked to sulfur have been discovered, that the subject has become a study on its own. For example, a wetting agent is obtained by treating dodecyl chloracetic ester with sodium phenyl mercaptan:

 $S{\cdot}CH_2{\cdot}CO{\cdot}O{\cdot}CH_2{\cdot}CH_2{\cdot}CH_2{\cdot}CH_2{\cdot}CH_2{\cdot}CH_2{\cdot}\cdot\cdot CH_3$

Or, a slightly different compound is obtained from dodecyl mercaptan and ethyl chloracetate, followed by saponification, probably, $CH_3 \;.\;.\;.\;.\;.\;.\; CH_2.S.CH_2.COONa$. This product possesses saponaceous and emulsifying properties and is of application in the pharmaceutical and rubber industries. Dodecyl mercaptan may be obtained from dodecyl bromide and sodium hydrosulfide.

The I. G. has a very comprehensive patent covering the manufacture of wetting, washing, vulcanizing, and cosmetic compounds from fatty alcohol mercaptans. Thus when dodecyl mercaptan is treated with five molecular proportions of ethylene oxide, a product of probable formula,

$$CH_3.CH_2 \;.\;.\;.\; S.CH_2.CH_2.O.(CH_2.CH_2.O)\;.CH_2.CH_2.OH,$$

is produced. This compound has emulsifying and washing properties. On sulfonation it yields a useful wetting and dispersing agent. By condensing decyl mercaptan, epichlorhydrin and ethylene oxide, a substance useful in preparing creams and ointments is obtained. Abstracted from *The Chemical Age*, Oct. 2, '37, p. 269.

Preservation Wood from Termites

According to details given in E. P. 464,731, wood can be completely protected from termites by means of preparations which consist of certain organic substances and arsenic, these being liquids in which the arsenic is present in dissolved form.

The organic liquids used are respiratory poisons, and the arsenic compound is incorporated with the respiratory poison in dissolved form. Arsenious oxide is not directly soluble in the organic respiratory poisons used, but dissolves in glycerin with a formation of a glycerin ester; and it has been found that this solution can be made to form a homogeneous liquid phase with the respiratory poisons. It has also been found that the glycerin ester can be caused to dissolve and form a homogeneous liquid phase in a number of respiratory poisons if the ester is mixed with an alcohol, for example, ethyl alcohol.

The following are examples of insecticidal preparations made in accordance with the invention:

To a solution which contains 2 parts of arsenious oxide and 3 parts of glycerin in form of the glycerin ester, there are first added 7 parts ethyl alcohol, then 11 parts ethyl glycol. Seventy-seven parts of mono-chlornaphthalene are then added to mixture and stirred in. A clear solution is formed.

To a solution which contains 1.8 parts arsenious acid and 2.0 parts glycerin in the form of the glycerin ester, there are first added 10.0 parts ethyl alcohol and then 17.4 parts ethyl glycol. 68.1 parts of decahydronaphthalene are then added to this mixture and stirred in. A clear solution is formed. Reference is made in the specification to E. P. 407,058.

Naphthol Base to be Produced

The Tokunaga Chemical Laboratory (Japan) has developed a method of producing a fast black naphthol B. B. base, production of which has hitherto been impossible because of technical difficulties and a patent controlled by the German I. G. Matter now is in dispute, and I. G. has entered suit on ground of infringement of its patent, reports Trade Commissioner Paul P. Steintorf, Tokyo.

Germ-proof Fabric

A fabric, specially impregnated to render it germ-proof is being marketed under the name "Vi-giene" by Burgess, Ledward & Co., Ltd., Walkden, Lancashire, England.

Waterproofing Compound for Sports Wear

The Sta-Dry Co., Lloyd Bldg., Seattle, Wash., has introduced a waterproofing repellent designed for outdoor togs and sports wear, called "Sta-Dry." It is equally efficient for all woolens, cottons, and mixtures. Besides insuring protection of garments against exposure to wet weather conditions, it renders them impervious to perspiration.

Waterproofing Agent

Ramasit KN Conc, waterproofing agent for application to animal, vegetable, and artificial fibres, has the advantage that materials so treated have a soft feel and not the harshness commonly shown by waterproofed fabrics, according to General Dyestuff, maker.

Textile Softening and Finishing Agent

Soromine S, I. G. product marketed by General Dyestuff, is a softening and finishing agent particularly recommended for rayon crepe, hosiery and mercerized embroidery yarns.

New Dyes

General Dyestuff announces the following new dyes: Celliton Discharge Rubine BBF, which is easily dischargeable to a clear white with Decroline Soluble Conc.; is also very well suited for direct printing. Celliton Fast Yellow 7G, producing extremely clear greenish yellow shades of good fastness to light, is adaptable for fast to light greens. Celliton Fast Blue FFR, an acetate dyestuff of exceptionally clear reddish blue shade, levels well and is fast to light. Rapidogen Golden Orange IGG yields a clear golden orange shade, and the prints have excellent fastness to light, washing, and chlorine. Rapidogen Black IT has all around fastness on printed styles, and yields full blacks of excellent fastness to light, washing, and chlorine; also produces very fine greys. Diazo Brilliant Orange 3G, recommended because of its very good dischargeability with neutral and alkaline pastes, has very good fastness to washing. Indanthren Brilliant Scarlet FR Suprafix is well suited for direct printing, production of bright scarlet discharges, or for resist under Algosol dyeings or Aniline Black. Indanthren Orange RR Powder Fine for Dyeing is a homogeneous dyestuff for production of reddish shades of orange of excellent fastness to light. New I. G. products offered by General Dyestuff include: Brilliant Indo Blue 5G, new homogeneous dyestuff, producing bright greenish blues which are distinguished from ordinary patent blues by good fastness to washing, milling, perspiration, and sea-water. Chrome Fast Yellow 8GL is of special interest for production of bright green shades with chrome colors.

Heat Test for Dyes

A simple test for fastness of dyeings to elevated temperatures is given by Schwertassek in *Textilberichte*, May. Set up a one-inch test tube containing mineral oil and arranged with a thermometer and means of heating. Portion of tube surrounding thermometer bulb and oil must be clean and free to allow for contact with a strip of the dyeing which is to be tested.

The strip can be pressed against the hot tube at the required temperature for the required period of time. The apparatus must be set up firmly and suitably shielded from the lamp

flame, if that is used as the source of heat. Tests can be made readily at more than one temperature; 270° C. was found, however, to serve well for direct dyes on cotton, linen and rayon. The latter was not weakened. Some colors change at higher temperatures such as 335° C., but the fibers begin to undergo decomposition. In fact some dyes are more stable than the fibers themselves.

Synthetic Resin from Silkworm Droppings

Silkworm droppings are used in manufacture of new synthetic resin called Sunlite, now being made by a Japanese firm, according to Trade Commissioner Paul P. Steintorf, Tokyo. Product is said to compare favorably with phenolic resins as regards water, acid and alkali resistance. Cost of production is expected to be lower than the phenol-formaldehyde condensation products because of the practically unlimited supply of raw material in Japan.

Lucite in Construction Field

At the World's Fair, to be held in New York in 1939, it is reported that the Heinz Co. will occupy a building constructed in the shape of a "pickle" and made entirely from Lucite. Color will be green; but it will be transparent so the light will shine through.

Coal-Tar Resin

Paradine, a dark, low-priced coal-tar resin possessing characteristics which make it available for use in numerous fields where light color is not imperative, but low cost is vitally important, is announced by Neville Co., Neville Island, Pittsburgh, Pa. It has the following characteristics: It is completely soluble in coal-tar (aromatic) solvents and may be formulated into varnishes containing 100 per cent. mineral spirits; upon heating it softens, becoming plastic below its melting point and fluid above it; stable to heat up to 190°-200° C., slow decomposition resulting upon prolonged heating above these temperatures. It is chemically neutral and inert; resists water, alkalis, and dilute acids, as prolonged immersions have shown, as well as coumarone-indene resins, which have long been used where protection against such corrosive conditions is demanded. It is a brittle resin having a conchoidal fracture and high natural gloss. Its coal-tar origin is probably responsible for its compatibility with a wide variety of resins, plastics, oils, rubber, and rubber derivatives. Pigments and fillers have been found to disperse rapidly and thoroughly in the molten resin, as it seems to possess remarkable wetting power.

Adhesive for Safety Glass

An adhesive or binder for the manufacture of safety glass, used in Russia with success, consists of a mixture of sodium silicate and casein. Manufacture of the glass by this preparation takes only three minutes under a pressure of 14 kilos per sq. cm. and at a temperature of about 100°C. The capacity of the press is increased by some 200 per cent., while the cost of the process has been reduced by 50 per cent., according to information published in *The Chemiker Zeitung*, and reported in the *Pottery Gazette and Glass Trade Review*.

Glue Holds Copper Sheets to Walls

Benjamin K. Albrecht, Rowayton, Conn., has invented a glue which makes possible the first commercial use of copper sheets as wall decorations, according to an announcement by officials of the New York World's Fair of 1939. Discovery will not be patented.

Black Gum Source of Newsprint

Process for manufacture of newsprint from black gum wood was made public recently by Dr. Charles Herty, Savannah, Ga. He states that it means addition of 40 per cent. more to the already vast resources of the South for the manufacture of paper, particularly newsprint. Black gum paper is superior to the average of seventeen commercial varieties in tensile strength, burst, and tear. It is bright in color, smooth-surfaced and prints well.

Enamels for Metal Trim

A new line of extra durable, quick drying enamels for all metal surfaces are being offered by Everseal Mfg. Co., B'way & 57th St., New York City. F. W. B. enamel finishes (Fortified with Bakelite) represent a marked advance in brush and spray finishes formulated especially for doors, door sashes, door visers, balustrades, radiator covers, grills, etc. They offer maximum resistance to the harsh and dulling effects of acids, alkalis, and caustics found in soaps and washing compounds.

In addition to these properties, the colors are sun fast and may be recommended for exterior metal surfaces. They are also used advantageously for gasoline station pumps and for the repainting of automobiles, motor trucks, and tractors.

Aluminum Spraying Powder

To spray fine aluminum so that it closely imitates plated metal, the Ed. C. Ballou Co., 255 W. 14 St., New York City, announces "No. 450 Mesh Aluminum." Product gives a maximum of bulking value, and for spraying purposes only 3½ to 4 oz. are necessary to the gallon of bronzing liquid.

Cohune Nut Fatty Acids Similar to Coconut

Examination of the fatty acids of cohune nut fat, product of the cohune palm nut which grows abundantly in British Honduras, shows their composition to be closely similar to those for the fatty acids of coconut oil and not very different (except in the content of caprylic, capric and oleic acids) from the corresponding data for palm kernel oil acids. In the samples examined, the outstanding features are the presence of 45-50 per cent. combined lauric acid, about 15-18 per cent. combined myristic acid, about 5-10 per cent. combined oleic acid, and from 6 to 14 per cent. caprylic and capric acids. A report on "The Fatty Acids of Cohune Nut Fat" appended to a report on "The Cohune Nut Industry of British Honduras" is available for a short loan period to accredited American firms upon application to the Chemical Division of the Bureau of Foreign and Domestic Commerce. (Vice Consul Culver E. Gidden, Belize).

Coal Tar as Rust Preventive

An interesting observation regarding use of coal tar for protection against rusting of bolts and nuts in use on agricultural appliances in Germany has been made and reported by "Engineer," *Paper-Maker & British Paper Trade Journal*, Oct. 1, '37, p. 146, T. S. It is stated that where the bolt threads had been treated with coal tar before use, the nuts could be loosened with ease after a period of ten years, and even under the severest conditions a good protection was provided for three years or more.

"Speed" Primer for Metal Products

A synthetic primer for use on metal products that air-dries out of dust in 5 minutes, thereby reducing the rejects due to shop dust and dirt, is announced by Maas & Waldstein, Newark, N. J. This new "speed" primer is suitable for use under air-drying lacquer-enamels or baking synthetic enamels, or as a shop coat. It air-dries, or can be force dried or baked, giving a very flexible schedule ranging from 2 hrs. at 160° F. to 20 mins. at 275° F. It has good adhesion, excellent building and hold-out properties and is easily sanded.

Concrete Dispersing and Catalytic Agent

TDA, a newly-discovered dispersing and catalytic agent, when used in Portland cement, results in a concrete of greater workability which hardens rapidly and after hardening has a fine, uniform structure, homogeneous throughout. According to Dewey & Almy Chemical, Cambridge, Mass., maker, product by its dispersing action prevents agglomeration of cement particles during the mixing process. This effect is enhanced by the catalytic action of TDA so that hydration is more rapid and bleeding is reduced.

Cement Waterproofing

A process for manufacture of calcium stearate in bead form has been perfected by Reardon Color & Chemical Works, 836 Reedy St., Cincinnati, O. It is used in manufacture of cement and also to render same waterproof. Advantages claimed for this process are:

(1) An increase upon analysis in true calcium stearate to 95.1 per cent. This is higher than in the powdered form.
(2) Reduction of approximately 25 per cent. in price.
(3) Beads are about 1/8 in. in diameter, very irregular in shape, and are fed into the grinding mill with the cement clinker. There is practically no mixing cost.
(4) Because of their irregular shape, the beads tend to travel along with the clinker and insure a more uniform dispersion than is possible with a dry powder. The beads thus become thoroughly interground with the cement.
(5) The beads are absolutely dustless, and increase operating cleanliness and convenience.

Mercury Base Fungicide

"Verdasan D," a fungicide for control of brown patch of turf, is being marketed by Imperial Chemical Industries, Ltd., London. Product, active principal of which is a form of inorganic mercury, is said to be harmless to grass if properly used.

Glass Block Waterproofing Material

A transparent, penetrating, waterproofing material called Ablo is now available for use on glass block structures. Applied by brush or spray, it penetrates into the pores of the cement mortar, filling tiny holes and cracks, thus forming a perfect seal against entrance of moisture. *Ceramic Industry*, Oct. 1937, p.267.

New Cobalt Steel Formula

Development of a highly efficient cobalt steel at General Electric's Schenectady plant was made known at the annual convention of the American Society for Metals. In tests on machine-finishing articles whose appearance must be pleasing, the finished surface was so good that the usual emery cloth finish was omitted. The life was about ten times that of high-speed steel. Formula is 36 per cent. cobalt, 8 per cent. molybdenum, and 6 per cent. chromium, with small quantities of carbon and vanadium.

Pliable Glass Cloth

Experiment on the manufacture of glass cloth, made from threads so fine that 140,000 yards of them weigh only a pound, was undertaken recently in a new Owens-Illinois Glass laboratory, and company officials predict commercial marketing of the new product within a year.

New Titanium Pigment

A new type of titanium dioxide, identified as Titanox A phthalate treated, is a pigment which has similar tinting strength to the regular Titanox A and is claimed to have remarkable resistance to chalking. Tests conducted by Titanium Pigment Corp., New York City, maker, indicate that it is especially adaptable for use in automotive finishes and other industrial coatings in which maximum durability is required under severe use and exposure conditions.

Plating Rack Coating

Zetyl 220, manufactured by Nelson J. Quinn Co., 416 13th St., Toledo, O., is a synthetic product used for insulation of plating racks for nickel, copper, zinc, silver, and cadmium. The insulation will stand tank and cleaner temperatures up to 220° F. It is a heavy liquid that is used cold just as it comes from the can, and applied by brush or dipping, preferably over a wrapping of cotton tape. It requires no special equipment and can be applied by any workman who can use a paint brush.

Non-aqueous Waterproofing with Metallic Soaps

Textiles impregnated with benzine solutions of precipitated aluminum palmitate or stearate exhibit exceptionally highly porous waterproofed effects, characterized by a higher resistance to washing than those produced by other methods. Microscopic examination indicates that the aluminum salts are not only deposited on the fibres, but have also penetrated beneath the surface. Reported in *Seide und Kunstseide*, 1937, 42, 210-213.

Ground Slate as Paint Filler

German paint manufacturers are using increasing quantities of ground slate as a filling agent, according to *Chemical Trade Journal*, Sept. 24, '37, p.282. Material used is a clay slate, which is abundantly available in the Rhineland, Thuringia, etc., and which is marketed under the trade terms slate gray, mineral gray, silver gray, slate black, black chalk, etc.

Wetting Agents Make Water "Wetter"

Compounds with very pronounced properties of detergency, emulsifying action, penetration and wetting-out of large surface areas are available under the trade-mark "Tergitol." A tenth of an ounce added to a gallon of water makes the water actually "wetter," that is, the water penetrates whatever it touches almost instantly. Announcement of this development was made by Dr. B. G. Wilkes, Mellon Institute, and Dr. J. N. Wichert, Carbide & Carbon, So. Charleston, W. Va., at the meeting of the A.C.S. in Rochester. These agents are well suited for the impregnation of materials where it is desired to impart future absorbency, and they have been found to serve as emulsifying agents.

New Uses for Viscous Foil

It is reported that viscous foil is being applied as a wrapping for copper wire on electrical motors before the usual yarn wrapping is applied. A number of manufacturers are also using multi-layers of viscose foil as substitutes for bituminous binders. It has been discovered that when asbestos is used as a fire-protective material in electrical equipment the use of an inner lining of viscose foil improves the dielectric properties of the asbestos.

Enamel Frit

Designated as No. 2117, new frit, smelted under its continuous process, has been developed as an improved super opaque material for one coat enameling, and is said to offer qualities not available heretofore in a single sheet iron cover coat. Manufacturer, Porcelain Enamel & Mfg. Co., Baltimore, states that it is used without blending with other enamels and shows high tear resistance and similarly high opacity. It produces a high gloss and offers broad working qualities, exceptional set and wide firing range.

Textile Finishing Process

A new method of treating cotton goods which consists of applying an alkali-soluble cellulose ether to the goods has been introduced abroad by Dr. Lilienfeld, of Vienna, and is reported in *The Chemical Trade Journal*. Process is claimed to give materials the property of retaining their original newness of "handle" and appearance. The cellulose-ether solution is either used to coat the cotton fibres with a fine, transparent film, or else to impregnate the cotton by means of pressure machines. It can be employed to give a linen-like property to fabrics such as damasks, table covers, sheetings, pillow cases, etc., but, according to the concentration, varying degrees of softness or stiffness are obtainable, and the original properties remain throughout the life of the fabric, which may be laundered regularly.

Aluminum Phosphide as Insecticide

German chemical manufacturers are attempting to find wider use for aluminum phosphide as an insecticidal agent, according to *Chemical Trade Journal*, Sept. 24, '37, p.281. A recently patented method, which attempts to overcome the difficulties and risks involved in transporting phosphide, mixes the material with cuprous oxide and burnt lime, the former combining with any hydrogen phosphide which may be liberated in transport or storage and the latter binding water and acid.

U. S. Chemical Patents

A Complete Check—List of Products, Chemicals, Process Industries

Agricultural Chemicals

Removal fluorine from phosphate rock. No. 2,093,176. Gerhard Tromel to Kaiser-Wilhelm-Institut fur Eisenforschung (eingetragener Verein), both of Dusseldorf, Germany.

Manufacture phosphate fertilizer from rhodochrosite, phosphoric acid and a calcium mineral, reactive with phosphoric acid to produce monocalcium phosphate. No. 2,093,460. Walter H. MacIntire, Knoxville, Tenn., to T. V. A., Wilson Dam, Ala.

Manufacture mono-manganese phosphate from rhodochrosite and phosphoric acid. No. 2,093,461. Walter H. MacIntire, Knoxville, Tenn., to T. V. A., Wilson Dam, Ala.

Improved process for production ammonium sulfate. No. 2,095,074. Thor Falck Muus, Rjukan, Norway, to Norsk Hydro-Elektrisk Kvaelstofaktieselskab, Oslo, Norway.

Cellulose

Preparation cellulose esters containing dicarboxylic acid groups. No. 2,093,462. Carl J. Malm and Chas. E. Waring, Rochester, N. Y., to Eastman Kodak Co., Jersey City, N. J.

Preparation inorganic salts of cellulose dicarboxylates. No. 2,093,463. Carl J. Malm, Rochester, N. Y., and Chas. E. Waring, Dayton, O., to Eastman Kodak Co., Jersey City, N. J.

Preparation cellulose esters containing succinyl groups. No. 2,093,464. Carl J. Malm, Rochester, N. Y., and Chas. E. Waring, Dayton, O., to Eastman Kodak Co., Jersey City, N. J.

Moisture permeable regenerated cellulose pellicle containing a water soluble softener and an anti-sticking composition. No. 2,095,129. Donald E. Drew, Kenmore, N. Y., to du Pont, Wilmington, Del.

Process separating a bleached pulp cellulose fibre from a fibre mass admixed with undesired other natural substances. No. 2,095,194. Adam Hoche, Brooklyn, N. Y., to Cellulose Research, Inc., Chicago, Ill.

Coal Tar Chemicals

Coke oven door. No. 20,515. Reissue. Paul Van Ackeren, Essen, Germany, to Koppers Co., corp. of Del.

Separation mixtures of chlor-phthalic acid and anhydrides, by treatment with sulfuric acid. No. 2,092,795. Ernest George Beckett, Cecil Shaw, Wm. Elliott Stephen, George Crowe Semple, and Robert Fraser Thomson, Grangemouth, Scotland, to Imperial Chemical Industries, Ltd., corp. of Great Britain.

Reacting an arylamine of the benzene series with an alpha naphthylamine-sulfonic acid to produce an arylamino-naphthalene sulfuric acid. No. 2,092,867. Otto Allemann to du Pont, both of Wilmington, Del.

Manufacture phenanthrene derivatives; heating a hydrodiphenyl with a compound of the class of quinones, aliphatic acids, esters and anhydrides. No. 2,092,902. Edward de Barry Barnett and Cyril Alec Lawrence, London, England, to Imperial Chemical Industries, Ltd., corp. of Great Britain.

Preparation mono-sulfonic acid of chrysene having a substituent of the group of amino and nitro groups in the 2-position. No. 2,093,113. Werner Schultheis, Frankfort-am-Main, Germany, to General Aniline Works, Inc., New York City.

Preparation aromatic amines which contain the trifluoromethyl group. No. 2,093,115. Arthur Wolfram and Otto Scherer, Frankfort-am-Main, and Emil Hausdorfer, Hofheim-am-Taunus, Germany, to General Aniline Works, Inc., New York City.

Preparation 2-acylacetylaminothiazole compounds. No. 2,093,214. Gerhard Schrader, Opladen, near Cologne, and Werner Zerweck, Frankfort-am-Main-Fechenheim, Germany, to General Aniline Works, Inc., New York City.

Manufacture symmetrical N,N'-diarylureas; comprising reaction of a primary arylamine with phosgene in presence of a tertiary base but in absence of any secondary base. No. 2,093,265. Samuel Coffey and John Edgar Schofield, Huddersfield, England, to Imperial Chemical Industries, Ltd., corp. of Great Britain.

Manufacture condensation products of crotonaldehyde; reacting with crotonaldehyde upon cyanacetic acid in presence of an aqueous solution of an alkaline condensing agent. No. 2,093,519. Karl Hamann, Krefeld-Uerdingen, Germany, to I. G., Frankfort-am-Main, Germany.

Production 2-aminoquinizarin and substitution products; causing hydrogen to act in the heat on a 2-nitroquinizarin in presence of a diluent and a reduction catalyst. No. 2,093,590. Hans Schlichenmaier, Kelkheim in Taunus, and Ludwig Wilhelm Berlin, Frankfort-am-Main-Hochst, Germany, to General Aniline Works, Inc., New York City.

Preparation a halogenated dihydroxy benzene composition embodying aliphatic group-CH_2R, said group being joined to a carbon atom of the benzene ring, R being a secondary alkyl radical containing more than 3 and not more than 11 carbon atoms. No. 2,093,778. Lucas P. Kyrides, Webster Groves, Mo., to Monsanto Chemical Co., St. Louis, Mo.

Preparation sulfamides, being lightly colored oily or solid masses soluble in ethyl alcohol and capable of considerably reducing surface tension of mercerizing liquors when added thereto. No. 2,093,947. Otto Albrecht to Society of Chemical Industry in Basle, both of Basel, Switzerland.

Improved method manufacturing polynaphthyl alkylene ethers. No. 2,093,990. Harold G. Bowlus, Penns Grove, N. J., to du Pont, Wilmington, Del.

Apparatus for electrical carbonization of coal. No. 2,094,027. Ralph B. Stitzer, Sheffield, Ala.

Production benzothiazyl sulfonium compounds. No. 2,094,090. Alfred William Baldwin, Blackley, Manchester, England, to Imperial Chemical Industries, Ltd., corp. of Great Britain.

Manufacture polymer carboxylic acids and derivatives. No. 2,094,213. Karl Hamann, Krefeld-Uerdingen, Germany, to I. G., Frankfort-am-Main, Germany.

Preparation pyrene 3, 5, 8, 10-tetra-sulfonic acid and derivatives. No. 2,094,224. Ernst Tietze, Cologne-am-Rhine, and Otto Bayer, Leverkusen-I. G.-Werk, Germany, to General Aniline Works, Inc., New York City.

Preparation 1:4:5 tribenzoylamino-8-hydroxy-anthraquinones. No. 2,094,311. Max Utzinger and Max Bommer, Riehen, near Basel, Switzerland, to Society of Chemical Industry in Basle, Basel, Switzerland.

Manufacture synthetic balsam by condensation of phenols with aldehydes. No. 2,094,373. Louis Charles Frederic Pechin, Bois-Colombes, France, to Brick Trust, Ltd., London, England.

Preparation esters of keto acids. No. 2,094,453. Alphons O. Jaeger, Mt. Lebanon, Pa., to American Cyanamid & Chemical Corp., New York City.

Manufacture 2,4-dialkylquinolines and decomposition amine-ketone reaction products. No. 2,095,126. David Craig, Silver Lake, O., to B. F. Goodrich Co., New York City.

Process for improving tars. No. 2,095,190. Walter Bartholomaus Heuscher to Lonza Elektrizitatswerke und Chemische Fabriken Aktiengesellschaft, both of Basel, Switzerland.

Coatings

Indirectly heated cathode assembly; cathode sleeve coated on outside with oxides of high electron sensitivity, inside a reversely coiled tungsten wire having coherent insulating coating comprising chemically pure alumina and a refractory oxygenic barium compound. No. 2,092,815. Geo. R. Shaw, Verona, N. J., to Radio Corp. of America, corp. of Del.

Methods of coating abrasive grains, applying film of solvent containing a synthetic resin bonding material. No. 2,092,903. Raymond C. Benner and Romie L. Melton to Carborundum Co., all of Niagara Falls, N. Y.

Production bright, smooth coatings of cadmium-tin alloy on ferrous articles; adding tin in addition to cadmium to a cyanide electrolytic bath. No. 2,093,031. Leroy Camel, Maple Heights, O., to Plating and Galvanizing Co., Cleveland, O.

Apparatus for applying a coating of adhesive in liquid state to paper and similar materials. No. 2,093,221. Alfred Winkler and Max Dunnebier, Neuwied, Germany.

Protective coating and sheathing for cables, pipes, etc. No. 2,093,411. Edward Bowden, London, and Donal O'Duffy, Middlesex, England, to Enfield Cable Works, Ltd., London, England.

Impregnated, composite material, having coating of an organic cellulose derivative material. No. 2,093,451. Henry Jenett, Demarest, N. J., to Celanese Corp. of America, corp. of Del.

Priming coat containing a natural resin-polybasic acid-polyhydric alcohol complex. No. 2,093,715. Carleton Ellis to Ellis-Foster Co., both of Montclair, N. J.

Sensitized blue print paper coating containing an alkaline hydrolyzable metal compound, a light-sensitive iron salt in the ferric state, and an alkali metal ferrocyanide. No. 2,093,738. Alger P. Reynolds, No. Beverly, Mass., to Spaulding-Moss Co., Boston, Mass.

Method processing sheet material, passing same through sulfuric acid bath, then through bath of glycerin and grape or starch sugar; next coating with a binding agent including drying oils; applying a binding agent consisting of resin, copal or like; finally adding abrasive materials to surface. No. 2,093,852. Fritz Simon, Hamburg, Germany, to Norddeutsche Schleifmittel-Industrie, G.m.b.H., Altona-Lurup, Germany.

Apparatus for aggregate coating. No. 2,094,237. Wallace M. Hendrick, Great Neck, and Gustave Loeffler, Jr., Flushing, N. Y.

Method providing surface coating adapted to be rendered fluorescent by electron bombarding; using carbon disulfide in process. No. 2,094,242. Henry W. Parker to Rogers Radio Tubes, Ltd., both of Toronto, Ont., Canada.

Coating and feeding device for soft, pliable sheets. No. 2,094,349. Frank P. Carlson, New York City.

Production green-colored, non-glossy coatings on granules; first applying coating containing sodium silicate, chrome oxide, and a reducing agent; then aluminum sulfate. No. 2,094,452. Carl E. Hillers to Blue Ridge Slate Corp., both of Charlottesville, Va.

Composite sheet material; using cellulose derivative coating composition in process. No. 2,094,613. Dorman McBurney and Raymond E. Thomas, Newburgh, N. Y., to du Pont, Wilmington, Del.

Liquid coating composition composed of paraffin, Pyroxylin, hydrogenated rosin, amyl acetate, alcohol, toluol. No. 2,094,771. Wm. Hale Charch, Buffalo, and Albert Hershberger, Kenmore, N. Y., to du Pont, Wilmington, Del.

Composition comprising reaction product of a chlorine containing rubber derivative and glycerin. No. 2,094,933. Herbert A. Winkelmann to Marbon Corp., both of Chicago, Ill.

Shellac-rubber hydrohalide compositions. No. 2,094,935. Herbert A. Winkelmann, Chicago, Ill., to Marbon Corp., corp. of Del.

Dyes, Stains, etc.

Production azo dyes and pigments. No. 2,092,796. Crayton K. Black to du Pont, both of Wilmington, Del.

Production yellow azo dyestuff, having M. P. of about 180°C.; of great fastness to light, insoluble in water, markedly soluble in alcohol, and appreciably soluble in oil. No. 2,092,971. Bernard Herstein, Brooklyn, N. Y., to U. S. Industrial Alcohol Co., New York City.

Manufacture water soluble dyestuffs of the anthraquinone series; treating anthraquinone derivatives with concentrated sulfuric acid at 18-40°C. No. 2,093,355. Ernst Gutzwiller to Chemical Works, formerly Sandoz, both of Basel, Switzerland.

In steam printing with chromium mordant dyestuffs on vegetable, animal or regenerated cellulose fibers, process for obviating harsh feel, uneven dyeing and loss of luster on imprinted parts caused by coagulation of thickener in presence of chromium mordant, by use of printing paste containing the mordant dyestuffs, gum arabic thickening, and a chromium mordant. No. 2,093,377. Heinrich Werdenberg, Neu-Allschwil, near Basel, Switzerland, to Durand & Huguenin, S. A., Basel, Switzerland.

Patents digested include issues of the "Patent Gazette," from Sept. 14 through October 5, inclusive.

Printing and dyeing compositions and processes. No. 2,093,402. Miles Augustinus Dahlen to du Pont, both of Wilmington, Del.

Wood stain solution; consisting of a dye dissolved in water, and organic solvent means miscible therewith to remain behind after water has evaporated. No. 2,093,424. Leonard P. Dove, Crete, Ill.

Production azo dyestuffs. No. 2,093,511. Jose Stephen Petrus-Blumberger, Delft, Netherlands, to General Aniline Works, Inc., New York City.

Dye fixing agent comprising a heat-treated formaldehyde condensation product comprised of urea, biuret, cyanuric acid, and guanidine. No. 2,093,651. Gustave A. Widmer, Phila., Pa., and Edw. W. Pierce, Clifton, N. J.

Production dyestuff intermediates. No. 2,094,078. Clifford Paine, Handforth, and Wilfred Archibald Sexton, Manchester, England, to Imperial Chemical Industries, Ltd., corp. of Great Britain.

Process for dyeing textile fiber of cellulosic origin with acid-chrome dyestuffs normally applicable to wool only. No. 2,094,082. Leslie Paige Rendell and Harry Augustus Thomas, Blackley, Manchester, England, to Imperial Chemical Industries, Ltd., corp. of Great Britain.

Production azo dyestuffs. No. 2,094,414. Curt Schuster, Ludwigshafen-am-Rhine, and Albert Schmelzer, Cologne-Mulheim, Germany, to General Aniline Works, Inc., New York City.

Production vat dyestuffs of the pyridonoanthraquinone series. No. 2,094,463. Paul Nawiasky and Rudolf Robl, Ludwigshafen-am-Rhine, Germany, to General Aniline Works, Inc., New York City.

Dyeing process. No. 2,094,501. Joseph Schmitz, Jr., Phila., Pa.

Preparation indigoid dyes. No. 2,094,596. Emeric Havas, Pitman, N. J., to du Pont, Wilmington, Del.

Process dyeing cellulose esters and ethers. No. 2,094,597. Emeric Havas, Pitman, N. J., to du Pont, Wilmington, Del.

Production dischargeable blacks on textiles of an organic derivative of cellulose. No. 2,094,770. Geo. Holland Ellis and Henry Chas. Olpin, Spondon, near Derby, England, to Celanese Corp. of America.

Improving fastness of colorations produced with aid of amino-anthraquinone dyestuffs on textiles. No. 2,094,809. Henry Charles Olpin and Geo. Holland Ellis, Spondon, near Derby, England, to Celanese Corp. of America, corp. of Del.

Preparation complex metal azo compounds. No. 2,094,832. Hermann Winkeler, Ludwigshafen-am-Rhine, and Erich Fischer, Bad Soden in Taunus, Germany, to General Aniline Works, Inc., New York City.

Production dis- and tris-azo dyestuffs. No. 2,094,845. Hans Krizikalla and Ludwig Neumann, Ludwigshafen-am-Rhine, Germany, to General Aniline Works, Inc., New York City.

Process dyeing pelts, furs, hairs, feathers and products made from these materials; by treatment in bath containing an oxidizing agent and a salt of the general formula $R—OH.H_2N.R'$. No. 2,094,952. Erich Lehmann, Priorau, Kreis Bitterfeld, Germany, to General Aniline Works, Inc., New York City.

Process dyeing skins and pelts; treating same in bath containing an oxidizing agent, a dispersing agent and a salt-like compound. No. 2,095,070. Erich Lehmann, Priorau, Kreis Bitterfeld, Germany, to General Aniline Works, Inc., New York City.

Preparation alkylamino derivatives of acid-substituted dyestuffs. No. 2,095,077. Ralph B. Payne, Elma, N. Y., to National Aniline & Chemical Co., Inc., New York City.

Aqueous dye bath comprising water insoluble dye and a monoalkyl ether of ethylene glycol, and acetone. No. 2,095,221. Ida M. Smith, Crestwood, N. Y.

Explosives

Production nitrated cellulosic materials highly resistant to acids. No. 2,092,749. Geo. B. Bradshaw to du Pont, both of Wilmington, Del.

Fine Chemicals

Purification synthetic camphor; in first step dissolving camphor in concentrated acetic acid. No. 2,093,100. Franco Santarelli to "Montecatini" Societa Generale per l'Industria Mineraria ed Agricola, both of Milan, Italy.

Preparation barbituric acid compound. No. 2,093,120. Werner Ursum, Berlin-Wilmersdorf, Germany, to E. Taeschner, Chem.-pharm. Fabrik, Potsdam, Germany.

Production acetaldehyde by catalytic hydration of acetylene. No. 2,093,146. Ernst Eberhardt, Ludwigshafen-am-Rhine, Germany, to I. G., Frankfort-am-Main, Germany.

Preparation tricarbocyanine salt. No. 2,094,580. Leslie G. S. Brooker, Rochester, N. Y., to Eastman Kodak Co., Jersey City, N. J.

Manufacture anti-halation layer; in first step producing pyrolusite from potassium permanganate. No. 2,095,018. Gustav Wilmanns, Wolfen Kreis Bitterfeld, and Wilhelm Schneider, Dessau in Anhalt, Germany, to Agfa Ansco Corp., Binghamton, N. Y.

Glass and Ceramics

Manufacture laminated glass. No. 2,092,789. Edgar D. Tillyer to American Optical Co., both of Southbridge, Mass.

Method hardening glass to develop permanent stresses therein and to minimize development of temporary stresses. No. 2,093,040. Fritz Eckert, Berlin-Charlottenburg, Germany, to American Securit Co., Wilmington, Del.

Manufacture of glass, glazes, or enamels of improved chemical resistivity. No. 2,093,194. Rudolf Geppert, Nuremberg-O., and Adolf Dietzel, Berlin-Zehlendorf, Germany, to Deutsche Tafelglas Aktiengesellschaft (Detag), Nurnberger, Furth, Bavaria.

Method identifying polished glass articles; marking same with a soluble glycerol phthalate paint, and heating article until paint is polymerized to a predetermined extent. No. 2,093,601. Theo. H. Drescher, Brighton, N. Y., to Bausch & Lomb Optical Co., Rochester, N. Y.

Composite safety glass sheet. No. 2,094,183. Wm. E. Nobbe to Libbey-Owens-Ford Glass Co., both of Toledo, O.

Ceramic raw material used as substitute for English China clay in manufacture of white wares; mixture of domestic kaolin and feldspathic flux, having composition: silica 47-57%, alumina 27-37%, potash 0.2-4.0%, soda 0.2-3.0%. No. 2,094,439. Joseph H. Weis, West Paris, Me., to Feldspathic Research Corp., New York City.

Industrial Chemicals, etc.

Production ethyl alcohol in continuous manner. No. 20,505. Reissue. Floyd J. Metzger to Air Reduction Co., Inc., both of New York City.

Continuous production acetylene and dry calcium hydroxide from calcium carbide. No. 20,527. Reissue. Carl Weibezahn and Felix Walter, Knapsack, near Cologne-am-Rhine, Germany to Aktiengesellschaft fur Stickstoffdunger, Cologne-am-Rhine, Germany.

Manufacture luminous cement; adding mixture of sulfides of calcium, cadmium, bismuth, lead, zinc, vanadium, and strontium, to a mass of hot clinkers of hydraulic cement, then grinding. No. 2,092,788. Ozro Dodge Thomas, one-half to Laurence B. Martin, both of Los Angeles, Calif.

Apparatus for recovery of sulfur from sulfur-bearing material. No. 2,092,794. Raymond F. Bacon, Bronxville, and Isaac Bencowitz, New York City, Bencowitz to Bacon.

Process freeing crystalline organic solid, which is sparingly soluble in cold water, from adherent acidified organic liquids; by treatment with an aqueous solution of a water-soluble salt of a sulfonated alcohol containing from 8 to 18 carbon atoms in the molecule. No. 2,092,797. James I. Carr to du Pont, both of Wilmington, Del.

Catalytic hydrogenation of esters of aliphatic alkylmonocarboxylic acids, using cobalt catalyst. No. 2,093,159. Otto Schmidt, Ludwigshafen-am-Rhine, to I. G., Frankfort-am-Main, Germany.

Refining mineral, vegetable, or animal oils, paraffins, hydrocarbon waxes, ester waxes or resins; weakly acidifying product with an acid and treating with chemically active, dry, finely powdered colloid substances. No. 2,093,348. Johannes Benedict Carpzow, Bornsen, near Hamburg, Germany.

Method controlling quality of combustion non-supporting gases having a substantial CO_2 content. No. 2,093,379. Walter J. Willenborg, Weehawken, N. J., to U. S. Fire Protection Corp., Hoboken, N. J.

Treatment raw vegetable gum of the prepared gum class. No. 2,093,405. Geo. W. Apsey, Jr., Rutherford, N. J., to Jacques Wolf & Co., Passaic, N. J.

Production silica gel, characterized by being free of liquids, and consisting of the skeleton of the colloid as it existed in the original undried gel. No. 2,093,454. Samuel S. Kistler, Urbana, Ill.

Manufacture alkali metal sulfides by reduction of the corresponding sulfates in the solid phase with a reducing gas and in presence of a catalyst. No. 2,093,504. Hans Zirngibl, Bitterfeld, Germany, to I. G., Frankfort-am-Main, Germany.

Preparation sulfonated esters of fatty acids. No. 2,093,576. Ernest Segessemann, Newark, N. J., to National Oil Products Co., Harrison, N.J.

Improved vapor phase process of producing higher molecular weight esters from lower molecular weight acids and esters. No. 2,093,695. Alfred T. Larson to du Pont, both of Wilmington, Del.

Humidity indicator comprising a coiled compound strip of a thin sheet of metal, a thin sheet of cellulose acetate, and a non-drying adhesive between. No. 2,093,767. Karl E. Rollefson, Highland Park, Ill., to Muter Co., Chicago, Ill.

Stabilization of glyceride oils against oxidation, said oils carrying a direct infusion of sesame seed including anti-rancidity constituents. No. 2,093,971. Sidney Musher to Musher Foundation, Inc., both of New York City.

Production hydrogen peroxide; electrolyzing alkali salts solution in presence of cathode containing active carbon and adding acid to catholyte to maintain latter in neutral condition. No. 2,093,989. Ernst Berl, Pittsburgh, Pa., to Mathieson Alkali Works, Inc., New York City.

Manufacture granular materials. No. 2,093,998. Clarence L. Colbert, Elizabeth, N. J., to Empire Trust Co., New York City.

Treatment porous surfaces to prevent asphalt adhering thereto by applying a water solution of a chemical substance. No. 2,094,040. Werner E. Kleinicke, Patchogue, and Gloster P. Hevenor, Malba, N. Y., to Johnson-March Corp., New York City.

Catalytic production ethyl chloride from ethylene and hydrogen chloride. No. 2,094,064. Walter Flemming, Ludwigshafen-am-Rhine, Germany, to I. G., Frankfort am-Main, Germany.

Recovery H_2S from gases. No. 2,094,070. Gustaf Henrik Hultman and Claes-Wilhelm Pilo, Stockholm, Sweden.

Manufacture carbohydrate derivatives. No. 2,094,100. Henry Dreyfus, London, England.

Method hydrogenating an abietyl compound. No. 2,094,117. Rollin J. Byrkit, Jr., Marshallton, Del., to Hercules Powder Co., Wilmington, Del.

Mixed higher alcohols; obtained by catalytic hydrogenation of cottonseed oil at temperature above 200°C. and at pressure of above 10 atmospheres. No. 2,094,127. Wilbur A. Lazier, Marshallton, Del., to du Pont, Wilmington, Del.

Preparation monobromopyrene; a faintly yellow substance melting at 55°C. No. 2,094,227. Arthur Wolfram, Frankfort-am-Main-Rodelheim, and Walther Schnurr, Bad Soden in Taunus, Germany, to General Aniline Works, Inc., New York City.

Preparation aryl mercury aromatic polybasic carboxylates. No. 2,094,253. Carl N. Andersen, Wellesley Hills, Mass., to Lever Bros. Co., corp. of Maine.

Stabilized carbon tetrachloride; using naphthylamine as stabilizer. No. 2,094,367. Edmund C. Missbach, Oakland, Calif., to Stauffer Chemical Co., corp. of Calif.

Stabilized carbon tetrachloride; using diphenylamine as stabilizer. No. 2,094,368. Edmund C. Missbach, Oakland, Calif., to Stauffer Chemical Co., corp. of Calif.

Apparatus for and method of preparing persulfuric acid or persulfates by electrolysis. No. 2,094,384. Carl W. Tucker and Karl F. Paul, Niagara Falls, N. Y., to du Pont, Wilmington, Del.

Production kyanite of definite predetermined composition. No. 2,094,440. Joseph H. Weis, West Paris, Me., to Feldspathic Research Corp., New York City.

Production potassium sulfate-ammonium sulfate double salt. No. 2,094,573. Karl J. Jacobi, Carlsbad, New Mexico, to U. S. Potash Co., New York City.

Treatment Chinawood oil; adding sulfur to convert said oil into a non-drying oil, and final treatment to render it compatible with usual ingredients of nitrocellulose lacquer. No. 2,094,590. Lawrence A. Donovan, Chicago, and Elmer A. Daniels, Hinsdale, Ill.

Production chemical compounds: bisthioindoxyls. No. 2,094,595. Emeric Havas, Pitman, N. J., to du Pont, Wilmington, Del.

Apparatus for chemical reactions. No. 2,094,601. Eugene J. Houdry, Phila., Pa., to Houdry Process Corp., Dover, Del.

Manufacture hydrotropic material; condensation product of alkylolamine and a member of the group of polycarboxylic acids, their esters, amides, halides, and anhydrides. No. 2,094,608. Wolf Kritchevsky, Chicago, Ill.

Manufacture hydrotropic material; condensation product of alkylolamine, amine, and a member of the group of higher carboxylic acids, their esters, halides, amides, and anhydrides. No. 2,094,609. Wolf Kritchevsky, Chicago, Ill.

Production alcohols from hydroxy carboxylic compounds. No. 2,094,611. Wilbur A. Lazier, Marshallton, Del., to du Pont, Wilmington, Del.

Production alkylene sulfides; causing an alkylene oxide to react with a salt of thiocyanic acid. No. 2,094,837. Karl Dachlauer, Hofheim-am-Taunus, and Lothar Jackel, Frankfort-am-Main-Hochst, Germany, to I. G., Frankfort-am-Main, Germany.

Production barium sulfate from barium sulfide. No. 2,094,902. Manfred Muller, Homberg, Germany, to Sachtleben Aktiengesellschaft fur Bergbau und Chemische Industrie, Cologne-am-Rhine, Germany.

Preparation potassium pentaborate. No. 2,094,881. Wm. A. Gale to American Potash & Chemical Corp., both of Trona, Calif.

Preparation alkylene sulfides; causing an alkylene oxide to react with a thiourea compound. No. 2,094,914. Karl Dachlauer, Hofheim-am-

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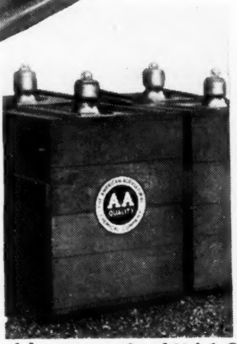


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Taunus, and Lothar Jackel, Frankfort-am-Main-Hochst, Germany, to I. G., Frankfort-am-Main, Germany.

Preparation stable colloidal sulfur; using caustic alkalies in process. No. 2,094,939. Edgar Boulogne, Lambersart, Nord, France, to Societe Industrielle des Derives du Soufre, Nord, France, and himself.

Composition obtained by reacting components consisting of a terpene alcohol containing a tertiary hydroxyl group and maleic anhydride in presence of a catalyst. No. 2,094,947. Irvin W. Humphrey to Hercules Powder Co., both of Wilmington, Del.

Lead chambers for manufacture sulfuric acid. No. 2,094,956. Rene Moritz, Chatou, France.

Preparation furfuryl alcohol; treating liquid furfural with hydrogen in presence of a copper-chromium-alkaline earth metal catalyst. No. 2,094,975. Homer Adkins and Ralph Connor, Madison, Wis., to Quaker Oats Co., Chicago, Ill.

Method making cement. No. 2,095,183. Walter Dyckerhoff, Mainz-Amoeneburg, Germany.

Manufacture water soluble chlorites of metals which form bases; introducing gaseous chlorine dioxide into an alkaline aqueous medium containing an inorganic alkaline material and a reducing agent. No. 2,092,944. Geo. Paul Vincent, Niagara Falls, N. Y., to Mathieson Alkali Works, Inc., New York City.

Manufacture water soluble chlorites; introducing gaseous chlorine dioxide into an alkaline aqueous medium containing an inorganic alkaline material and a carbonaceous reducing agent. No. 2,092,945. Geo. Paul Vincent, Niagara Falls, N. Y., to Mathieson Alkali Works, Inc., New York City.

Preparation tertiary-butyl derivatives of aniline; reacting acetanilide with tertiary-butyl chloride in presence of aluminum chloride. No. 2,092,970. Bernard Herstein, Brooklyn, N. Y., to U. S. Industrial Alcohol Co., New York City.

Preparation alkyl derivatives of aromatic amines; reacting an acylated aromatic amine, in presence of anhydrous aluminum chloride, with a compound selected from group of alkyl halides and alkyl hydroxides. No. 2,092,972. Bernard Herstein, Brooklyn, N. Y., to U. S. Industrial Alcohol Co., New York City.

Manufacture para tertiary butyl aniline; first reacting acetanilid with tertiary butyl chloride in presence of anhydrous aluminum chloride. No. 2,092,973. Bernard Herstein, Brooklyn, N. Y., to U. S. Industrial Alcohol Co., New York City.

Leather

Leather treatment; impregnating leather with composition containing a polymer obtained by polymerization of unsaturated hydrocarbons. No. 2,093,431. Per K. Frolich, Roselle, N. J., to Standard Oil Development Co., corp. of Del.

Metals, Alloys, Ores

Aluminum bronze alloys, highly resistant to air impingement corrosion and localized pitting, adapted for use in condenser tubes or like, composed of aluminum, arsenic, and copper. No. 2,093,380. Alan Morris to Bridgeport Brass Co., both of Bridgeport, Conn.

Process stripping platinum metals from a metal foundation. No. 2,093,406. Ralph Hall Atkinson, London, England, to International Nickel Co., Inc., New York City.

Method chromium plating. No. 2,093,428. Joseph J. Ford and Frank H. Beall to Emma D. Ford, all of New York City.

Removal oxidizable matters from iron or iron alloys in hot liquid state. No. 2,093,666. Adolf Vogt, Tschechnitz, near Breslau, Germany, to Dr. Alexander Wacker, Gesellschaft fur Elektrochemische Industrie G.m.b.H., Munich, Germany.

Manufacture bodies containing metallic carbides. No. 2,093,656. Gabriel Fodor, Paris, and Henri Garih, Neuilly-sur-Seine, France.

Copper-cuprous oxide rectifier formed from a copper body containing cadmium. No. 2,093,661. Geo. O. Smith, Bloomfield, N. J., to Bell Telephone Labs., Inc., New York City.

Hard compositions of matter. Nos. 2,093,844-5. Philip M. McKenna, Latrobe, Pa.

Froth flotation process for concentration of minerals. No. 2,093,898. Thos. James Taplin, Strawberry Hill, Middlesex, England.

Recovery of gold and/or silver from metallurgical products, comprising addition of carbonate of copper to pulp, and treatment with same with solution of a soluble cyanide in presence of ammonia. No. 2,093,958. Victor Thos. Edquist, Melbourne, Vict., Australia.

Removal gas from molten aluminum and its alloys; holding molten metal in container coated with interior lining containing cryolite and a binding agent. No. 2,094,028. Philip T. Stroup, New Kensington, Pa., to Aluminum Co. of America, Pittsburgh, Pa.

Method retarding wearing and seizing of metallic bearing surfaces, using lubricating medium and chemical action upon such surfaces. No. 2,094,097. Frederick Baxter Downing, Carneys Point, and Anthony Francis Benning, Penns Grove, N. J., to du Pont, Wilmington, Del.

Froth-flotation concentration of ores. No. 2,094,125. Cornelius H. Keller, San Francisco, Calif., to Minerals Separation No. American Corp., New York City.

Oxidizing lead to litharge; pouring molten lead into water to produce feathered lead, and adding sodium nitrate in presence of water. No. 2,094,232. Robert M. Cole, Bryn Athyn, Pa.

Treatment raw sulfide ore. No. 2,094,275. Thos. A. Mitchell to Hughes-Mitchell Processes, Inc., both of Denver, Colo.

Manufacture lead oxide. No. 2,094,276. Thos. A. Mitchell, Inglewood, and Robt. J. Dalton, Torrance, Calif., to Hughes-Mitchell Processes, Inc., Denver, Colo.

Method sulfating ore metal values of a sulfide ore. No. 2,094,277. Thos. A. Mitchell, Torrance, Calif., to Hughes-Mitchell Processes, Inc., Denver, Colo.

Low specific gravity magnesium base alloy, containing aluminum, zinc, manganese, a metal of the group of antimony and bismuth, and magnesium. No. 2,094,332. Georg Schichtel, Radenthein, Carinthia, Austria, to American Magnesium Metals Corp., Pittsburgh, Pa.

Method of uniting metals. Nos. 2,094,482-3. Wm. J. Weder, Phila., Pa., to General Electric Co., corp. of New York.

Metallurgical process; recovering values from scrap combustion radiators, etc. No. 2,094,632. Jesse O. Betterton, Metuchen, and George K. Baumann, Port Reading, N. J., to American Smelting & Refining Co., New York City.

Process for cutting metals with oxygen. No. 2,094,641. Geo. M. Deming, East Orange, N. J., to Air Reduction Co., Inc., New York City.

Froth flotation reagent; product obtained by mixing crude paraffin base petroleum oil, kerosene, and coal-tar creosote. No. 2,094,646. Philip M. Frantz, Pueblo, Colo., to Colorado Fuel & Iron Corp., corp. of Colo.

Ore reducing machine. No. 2,094,842. Alvah D. Hadsel, Oakland, Calif.

Reagent, useful in refining metallic material, for oxidizing impurities therein; being a solid chromium containing alloy having uniformly dispersed therein uncombined chromic oxide. No. 2,094,969. Gilbert E. Seil, Cynwyd, Pa., to Buffalo Electric Furnace Corp., Buffalo, N. Y.

Treatment metal surfaces. No. 2,095,105. Henry M. Smith, Scotia, N. Y., to General Electric Co., corp. of New York.

Fused salt bath for cementation of iron and steel, containing cyanide, and graphitic oxide as an agent for increasing cementation effect. No. 2,095,188. Hugo Hanusch, Berlin-Rauchfangswerder, Germany, to Deutsche Houghton-Fabrik G.m.b.H., Megdeburg, Buckau, Germany.

Naval Stores

Method refining rosin; using a petroleum hydrocarbon distillate containing furfural in process. No. 2,094,503. Donald H. Sheffield, Brunswick, Ga., to Hercules Powder Co., Wilmington, Del.

Paper and Pulp

Manufacture drawing paper, forming invisible pattern on paper with mercurous nitrate, forming second pattern with lead nitrate, treating paper with hydrogen chloride gas to convert compounds to chlorides, then treating with a soluble bisulfate solution to convert lead chloride to lead sulfate. No. 20,503. Reissue. Maurice D. McIntosh, Marion, Kans., to Louis S. Sanders, Cleveland, O.

Process and apparatus for manufacture paper. No. 2,092,798. Edgar Alexander Charlton to International Paper Co., both of New York City.

Device for continuously beating paper pulp, etc. No. 2,092,821. Wilhelm Thaler, Heidenheim-am-Brenz, Germany, to American Voith Contact Co., Inc., New York City.

Apparatus for cooking fibrous material in presence of digestion liquor. No. 2,093,267. Thos. L. Dunbar to Chemipulp Process, Inc., both of Watertown, N. Y.

Manufacture sized papers, wherein involatile, thermoplastic, pyrogenous residue, obtained from distillation of the liquid resin separated from spent alkaline pulping liquor resulting from pulping of pinewood, appears as a sizing ingredient. No. 2,093,337. Oscar F. Neitzke, Belmont, Mass., to Bennett, Inc., Cambridge, Mass.

Petroleum Chemicals

Separation oil containing paraffinic and naphthenic hydrocarbons into fractions respectively richer in paraffinic and naphthenic compounds, by extraction with a monohydroxy aromatic alcohol. No. 2,092,748. Edwin R. Birkhimer to Atlantic Refining Co., both of Phila., Pa.

Improved process for dehydrogenation of aliphatic secondary alcohols to produce ketones; subjecting vapors of first to catalyst consisting of copper, zinc, and magnesium. No. 2,092,870. Clayton M. Beamer, Elizabeth, N. J., to Standard Alcohol Co., corp. of Del.

Preparation drying oil; contacting mixture of cracked hydrocarbons with an active halide polymerizing agent and separating benzol soluble, acetone soluble oil liquid at about 400°F. at 2 mm. pressure. No. 2,092,889. Louis A. Mikeska and Anthony H. Gleason, Elizabeth, N. J., to Standard Oil Development Co., corp. of Del.

Prevention paraffin deposits in oil wells, using composition which includes sulfonated castor oil, mixture of corn oil and oleic acid soaps, 10° Bé. oxalic acid solution, naphthalene dissolved in benzene, sulfonated pine oil soap, oleic acid, and ammonia solution. No. 2,092,936. Thos. O. Smith to Sup-R-Treat Labs., Inc., both of San Antonio, Tex.

Continuous process of dewaxing mineral oil by continuously filtering chilled wax-bearing mixture at temperatures around 0° F. or lower. No. 2,092,968. Wm. P. Gee, Plainfield, N. J., to Texas Co., New York City.

Refining alkali wastes obtained from petroleum and like fractions to produce refined naphthenic acids. No. 2,093,001. Arthur L. Blount, Palos Verdes Estates, Calif., to Union Oil Co. of Calif., Los Angeles, Calif.

Production high molecular hydrogenation products of highly viscous character. No. 2,093,096. Mathias Pier, Heidelberg, Friedrich Christmann, Ludwigshafen-am-Rhine, and Ernest Donath, Mannheim, Germany, to Standard-I. G. Co., Linden, N. J.

Treatment of hydrocarbon oil. Nos. 2,093,278-9. Percival C. Keith, Jr., Peapack, N. J., to Gasoline Products Co., Inc., Newark, N. J.

Continuous process for direct hydration of olefines. No. 2,093,426. Henry Dreyfus, London, England.

Manufacture hydration products of olefines. No. 2,093,434. Walter Henry Groombridge and Reginald John Peek, Spondon, near Derby, England, to Celanese Corp. of America, corp. of Del.

Method and apparatus for treating hydrocarbon oils for subsequent cracking. No. 2,093,473. Ernest A. Ocon, New York City.

Dewaxing hydrocarbon oils; dissolving a wax-containing oil in 2-ethyl hexanol, precipitating wax from solution, and removing precipitated wax. No. 2,093,538. Harry T. Bennett and Dwight B. Mapes to Mid-Continent Petroleum Corp., all of Tulsa, Okla.

Production valuable synthetic liquid hydrocarbon practically free of sulfur. No. 2,093,571. Ernest A. Ocon, New York City.

Process cracking hydrocarbon oils for production of gasoline-like products. No. 2,093,588. Louis D. Forward to Forward Process Co., both of New York City.

Method and apparatus for refining hydrocarbon oil. No. 2,093,645. Walter J. Podbielniak, Chicago, Ill.

Production olefine sulfide; dispersing an olefine gas in a solution of sulfur in presence of a catalyst. No. 2,093,752. Werner W. Duecker and Claron R. Payne, Pittsburgh, Pa., to Texas Gulf Sulphur Co., corp. of Tex.

Hydrogenation and cracking of oils. No. 2,093,843. Ralph H. McKee to Ernest A. Ocon, both of New York City.

Production hydrocarbons boiling at 45 to 200°C. in standard Engler distillation. No. 2,094,128. Wilbur A. Lazier, Marshallton, Del., and John V. Vaughen, Lakewood, Ohio, to du Pont, Wilmington, Del.

Lubricant adapted to withstand high pressures; a mineral lubricating oil containing diphenyl. No. 2,094,202. Harry T. Bennett and Clare Prather to Mid-Continent Petroleum Corp., all of Tulsa, Okla.

Production odorant for gaseous fuels. No. 2,094,270. Wm. H. Hampton and John T. Rutherford, Berkeley, Calif., to Standard Oil Co. of Calif., San Francisco, Calif.

Mud laden fluid for oil or gas wells containing a colloidally dispersed natural zeolitic clay. No. 2,094,316. Roy Cross and Matthew Forbes Cross, to Kansas City Testing Laboratory, all of Kansas City, Mo.

Conversion hydrocarbon oils into lower boiling normally liquid hydrocarbons. No. 2,094,476. Georg Stern, Neckargemund, Germany, and Robert Hasenclever, New York City, to I. G., Frankfort-am-Main, Germany.

Treatment wells to increase rate of fluid production; applying reagent comprising mixture of a mineral acid and a hydrofluoric acid to geological formation at base of well. No. 2,094,479. James G. Vandergrift, Spencer, W. Va., to Wm. E. Snee, West Elizabeth, Pa.

Process for sweetening mercaptan-bearing hydrocarbon oil; contacting oil, in admixture with a gas containing free oxygen, with an adsorbent material impregnated with a maintained aqueous solution phase containing

cupric and chloride ions. No. 2,094,485. Albert E. Buell, Bartlesville, Okla., to Phillips Petroleum Co., corp. of Del.

Treatment petroleum cracking still gases containing gaseous olefines for production of alkyl sulfates. No. 2,094,546. Henry N. Lyons, Maplewood, N. J., to Power Patents Co., Jersey City, N. J.

Manufacture motor fuels. No. 2,094,554. Le Roy G. Story, Bronxville, N. Y., to Texas Co., New York City.

Treatment hydrocarbon oils. Nos. 2,094,585-6. Wallace A. Craig to Vapor Treating Processes, Inc., both of Los Angeles, Calif.

Manufacture high viscosity index lubricating oils. No. 2,094,593. Elmslie W. Gardiner, and Arthur L. Lyman, Berkeley, John W. Greene, Richmond, to Standard Oil Co. of Calif., San Francisco, Calif.

Removal mercaptans from hydrocarbon mixtures. No. 2,094,612. Wm. M. Malisoff and James H. Boyd, Jr., to Atlantic Refining Co., all of Phila., Pa.

Treatment mineral oils; extracting a Pennsylvania grade residuum oil containing components of different characteristics with paraldehyde. No. 2,094,802. Wilbert B. McCluer and Merrell R. Fenske, State College, Pa., to Pennsylvania Petroleum Research Corp., corp. of Pa.

Production more valuable products from olefinic hydrocarbons unsuitable as components of motor fuel and hydrogen formed in pyrolytic cracking of hydrocarbon oils. No. 2,094,907. Jean Delattre Seguy to Universal Oil Products Co., both of Chicago, Ill.

Method and apparatus for heating fluids. Nos. 2,094,911-2-3. Marion W. Barnes to Universal Oil Products Co., both of Chicago, Ill.

Process for heating fluids. No. 2,094,923. Lev. A. Mekler to Universal Oil Products Co., both of Chicago, Ill.

Method cracking oils in vapor phase. No. 2,094,980. Drue M. Evans, Wood River, Ill., to Petroleum Conversion Corp., New York City.

Apparatus for evaluating oil sands. No. 2,095,056. Kenneth H. Clough, to W. H. Curtin & Co., Inc., both of Houston, Tex.

Cracked gasoline normally tending to deteriorate and form gums on storage, containing an indophenol dye, to inhibit such gum formation. No. 2,095,211. Leo P. Chetobar, Bayonne, N. J., to Texas Co., New York City.

Pigments, Dry Colors & Fillers

Production green pigment, comprising iron compound of nitroso-beta-naphthol. No. 2,092,750. Alfred A. Brizzolara, New York City, and Alfred Siegel, Carneys Point, N. J., to du Pont, Wilmington, Del.

Process improving properties of a white pigment of group of titanium oxide and zinc sulfide, from standpoint of chalking in pigmented film-forming coatings; using aqueous slurry of an inorganic cementitious substance. No. 2,092,838. Henry A. Gardner, Washington, D. C.

Production a pulverized amorphous, white silica pigment free of agglomerations; having lower specific gravity, higher reflecting power, better suspension properties, a lower refractive index and less abrasiveness than micro-crystalline soft silica. No. 2,093,106. Jos. W. Ayers to C. K. Williams & Co., both of Easton, Pa.

Process dispersing carbon black pigments. No. 2,094,146. Paul F. Elliott, Parlin, and Robert Tyler Hucks, South River, N. J., to du Pont, Wilmington, Del.

Resins, Plastics, etc.

Catalytically-hardening molding compositions; being mixture of a urea-aldehyde condensation product and a compound selected from the group of salicylic-acetyl salicylic-and gallic acids. No. 2,092,754. Carleton Ellis to Ellis-Foster Co., both of Montclair, N. J.

Production resin of the coumarone type by polymerization of the polymerizable reactives more reactive than coumarone and indene contained in crude solvent naphtha. No. 2,092,998. Geo. Kenneth Anderson, Pittsburgh, and Wm. D. Johnston, Jr., Dormont, Pa., to Neville Co., corp. of Pa.

Catalytic polymerization process producing coumarone resin from polymerizable reactives of crude solvent naphtha. No. 2,092,999. Geo. Kenneth Anderson, Pittsburgh, and Wm. D. Johnston, Jr., Dormont, Pa., to Neville Co., corp. of Pa.

Method compounding a base for plastic compositions suitable for use as a paint or surfacer; first forming a preliminary homogeneous mixture of litharge and nitrocellulose solvent. No. 2,093,213. Arthur F. Rowe, Lansing, Mich.

Manufacture a water-soluble hard resin capable of being hardened with formaldehyde; first condensing together urea and hexamethylenetetramine in presence of heat and absence of formaldehyde. No. 2,093,364. Elly Pollak, Vienna, Austria.

Production polyhydric alcohol-carboxylic organic acid-weak polybasic inorganic acid-phenol-aldehyde condensation product. No. 20,513. Re-issue. Israel Rosenblum, New York City.

Method and apparatus for treating plastic material. No. 2,093,407. David S. Baker, Greenwich, Conn.

Production a solid, oil-soluble phenolic resin; by reacting hydroxydiphenyl and formaldehyde in presence of an organic salt of zinc. No. 2,093,481. Israel Rosenblum, Jackson Heights, N. Y.

Manufacture irregularly patterned stratified molded bodies showing bleeding color effects from molding powders. No. 2,093,652. Gustave Widmer and Alfred Juchli to Society of Chemical Industry in Basle, all of Basel, Switzerland.

Production hydrocarbon resin by polymerization of a liquid hydrocarbon mixture having an end-point not in excess of 220°C. and being rich in olefines, diolefines, and aromatics; polymerization being effected by a Friedel-Crafts catalyst. No. 2,093,749. Wallene R. Derby, Dayton, O., to Monsanto Chemical Co., St. Louis, Mo.

Production valuable condensation products from lower aliphatic monohydric alcohol esters of the lower fatty acids. No. 2,094,297. Walter Philip Joshua, London, and Herbert Muggleton Stanley, Great Bookham, England, and Otto Fuchs and Wilhelm Querfuerth, Constance, Baden, Germany, and John Blair Dymock, Cheam, England, to Deutsche Gold- und Silber Scheideanstalt vormals Roessler, Frankfort-am-Main, Germany.

Production base exchanging synthetic resin; first boiling mixture of a tannin and formaldehyde under a reflux condenser at constant volume for not less than one hour. No. 2,094,359. Willard H. Kirkpatrick to National Aluminate Corp., both of Chicago, Ill.

Production thio ethers; treating an N-vinyl pyrrole compound with a sulfur compound. No. 2,094,467. Walter Reppe and Fritz Nicolai, Ludwigshafen-am-Rhine, Germany, to I. G., Frankfort-am-Main, Germany.

Production ethers of resin alcohols. No. 2,094,545. Edwin R. Littmann to Hercules Powder Co., both of Wilmington, Del.

Dry molding composition consisting of raw sisal hemp fibers and a waterproof thermoplastic binder in such quantity to form a shatter-resisting molded article. No. 2,094,868. Wm. L. Baxter, Marblehead, Mass., to United Shoe Machinery Corp., Paterson, N. J.

Apparatus for compacting and surfacing plastic material. No. 2,094,910. Robert Wm. Baily, Phila., Pa.

An adhesive, and a plastic material capable of hardening through drying; using distillery slop, an alkali solution, phenol, and formaldehyde in process. No. 2,095,093. Louis J. Fuhrmann, Peoria, Ill.

Process coherently uniting hot plastic composition to metal. No. 2,095,198. James S. Reid, Shaker Heights, O., to Standard Products Co., Cleveland, O.

Rubber

Method increasing viscosity of a latex mix by adding emulsion of a saponifiable resin and water glass. No. 2,092,825. Arthur Behr, Paris, France.

Apparatus for vulcanizing rubber articles. No. 2,093,922. Hermann Meyer, Hanover, Germany.

Mold for forming rubber articles. No. 2,094,157. Robert B. Lowry, Niagara Falls, N. Y., to Hooker Electrochemical Co., New York City.

Preservation rubber; incorporating therein composite product obtained by condensing a primary aromatic amine with mixed cresols while splitting off water. No. 2,094,263. Albert M. Clifford, Stow, O., to Wingfoot Corp., Wilmington, Del.

Preparation chlorinated rubbers. No. 2,094,408. Ludwig Orthner and Otto Bohme, Leverkusen-I. G.-Werk, and Georg Meyer and Wilhelm Becker, Cologne-Mulheim, Germany, to I. G., Frankfort-am-Main, Germany.

Halogenated rubber halides; first reacting rubber with chlorine, then reacting resulting product with hydrogen chloride. No. 2,094,934. Herbert A. Winkelmann, Chicago, Ill., to Marbo Patents, Inc., corp of Del.

Method depositing rubber. No. 2,095,107. Andrew Szegvari to American Anode, Inc., both of Akron, O.

Vulcanizable composition, comprising rubber, sulfur, polymerized vinyl chloride, and a non-volatile mutual solvent for the rubber and polymerized vinyl chloride. No. 2,095,113. Jacob Emerson Wolfe, Akron, O., to B. F. Goodrich Co., New York City.

Textile, Rayon

Production staple fibre yarns from continuous filaments. No. 2,092,800. Wm. Alexander Dickie and Geo. Crawford Tyce, Spondon, near Derby, England, to Celanese Corp. of America, corp. of Del.

Manufacture spun yarn in short lengths; forming on filamentary material, of a water-insoluble organic cellulose derivative, an outer layer of degraded cellulose. No. 2,092,802. Henry Dreyfus, London, England.

Production staple fibre yarn from continuous filaments. No. 2,092,803. Henry Dreyfus, London, England.

Apparatus for winding and treatment of yarns. No. 2,092,811. Robert Wighton Moncrieff and George Wilson Harrison, Spondon, near Derby, England, to Celanese Corp. of America, corp. of Del.

Manufacture artificial silk, according to the bobbin spinning system. No. 2,093,140. Walter Schieber, Rottweil-am-Neckar, Germany, to I. G., Frankfort-am-Main, Germany.

Manufacture textiles from materials having at least two layers of fabric comprising filaments or fibres of cellulose organic derivative held together by means of a layer of impervious plastic composition containing a cellulose derivative. No. 2,093,425. Camille Dreyfus, New York City.

Impregnating natural silk threads with composition containing mahogany sulfonate, sulfonated vegetable oil, textile treating oil and water; treatment thereby adapting threads to be made into piece goods. No. 2,093,468. Abraham Moscowitz, New York City, to L. Sonneborn Sons, Inc., corp of Del.

Production textile yarns having rubber or latex incorporated in them. No. 2,093,880. Joseph Brandwood, Southport, England.

Method and apparatus for treating yarns. No. 2,093,914. Henry Janssen to Textile Machine Works, both of Wyomissing, Pa.

Process in which artificial filaments, etc., are rendered plastic by solvents or swelling agents, to a point where they may be readily stretched. No. 2,094,005. Henry Dreyfus, London, England.

Production improved and pleasing effects in textile filaments of a cellulose organic derivative. No. 2,094,081. Herbert Platt, Cumberland, Md., to Celanese Corp. of America, corp. of Del.

Apparatus for treatment artificial filaments, etc. No. 2,094,099. Henry Dreyfus, London, England.

Method processing a wet bucket cake of artificial thread. No. 2,094,579. Wm. Henry Bradshaw, Buffalo, John S. Fonda, Kenmore, N. Y., and Geo. W. Filson, Richmond, Va., to du Pont, Wilmington, Del.

Apparatus and spinning process for artificial silk. No. 2,094,617. Paul Pierrat and Eugene Colombu, Paris, France, to du Pont, Wilmington, Del.

Manufacture lustrous artificial filaments by a dry spinning method. No. 2,094,780. Henry Dreyfus, London, and Wm. Ivan Taylor, Spondon, near Derby, England, to Celanese Corp. of America, corp. of Del.

Manufacture artificial filaments, etc. No. 2,094,781. Henry Dreyfus, London, England.

Lustrous textiles impregnated with pigmented low-substituted cellulose derivative having complete initial solubility in dilute aqueous caustic alkali solution only at temperatures below 10°C. No. 2,095,028. James Craik, Stevenston, Scotland, to Imperial Chemical Industries, Ltd., corp. of Great Britain.

Stretch-spinning process of producing artificial silk by forcing a cuprammonium cellulose solution through suitable openings into hard water. No. 2,095,220. August Hartmann, Berlin-Lichterfelde, Germany, to American Bemberg Corp., New York City.

Water, Sewage Treatment

Apparatus for treatment of sewage. No. 2,094,909. Robert W. Baily, Phila., Pa., and Newenham A. Gray, Brooklyn, N. Y.

Ethylene for Dye Testing

Commercial ethylene diamine, a powerful solvent for dyes on the fiber, is finding use in tests for dye identification. It serves particularly well to distinguish between vat and "azoic" dyeings and prints on cellulose fibers. It is used in the system of dye identification given by Clayton in the *Journal of the Society of Dyers and Colourists* (53, 178), to which attention is also called as perhaps the best published system for this purpose. This or any other system is most useful when supplemented by specific confirmatory tests.

CHEMICAL SPECIALTIES

HOUSEHOLD
INDUSTRIAL
AGRICULTURAL

- Morpholine in Textile Chemistry
- Fireworks Chemicals
- Newer Sulfonates
- Water-repellent Finish
- Rubber Concrete
- New Names and New Goods
- Trade Marks and Patents

Trailer travelling exhibit of Roxalin Flexible Lacquer Co. coatings

The Newer Sulfonates

A non-technical survey of the sulfonated alcohols and their chemical associates which are revolutionizing the formulas and uses of detergents and wetting agents.

By Benjamin Levitt

LITERATURE on the manufacture of the sulfonated higher alcohols and numerous similar compounds of the aliphatic as well as aromatic series consists chiefly of patents and the advertising matter of producers. Almost one thousand patents on these compounds have been taken out in America, England, France, and Germany. Naturally, some of the most useful ones have been taken out by the same inventor in several countries. In any case there must be over three hundred separate patents, and the major corporations are still vying with one another for patent supremacy.

What is it all about?

All of these compounds exhibit marked powers of dispersion, wetting-out, and detergency and they have also good stability in acids, alkalies, even in the presence of metallic salts such as the alkaline earths. However, they may be decomposed by boiling with mineral acids, upwards of 7 per cent. strength.

The pure concentrated sulfate esters are quite expensive. By that, the author means no criticism, for the products covered by patents require intricate syntheses. In order to make them more acceptable to consumers, most of these materials are diluted to a considerable extent in special solvents, or are offered in powdered form heavily loaded with Glauber's salt.

These sulfonated chemicals are superior to soap by virtue of their usefulness in acid solution, and their effectiveness in the presence of lime or magnesia. These properties are valuable in textile dyeing where sulfonates are useful for quickly wetting-out yarns and fabrics and for dispersing dyes evenly. They serve as excellent assistants in silk soaking and in the manufacture of leather for striking-through of various oils and emulsions. Their use, no doubt, will be extended to the paint industry in wetting-out pigments during grinding. Sulfonated alcohols and similar compounds have already been applied to toilet goods manufacture, serving as shampoos, lathering aids in shaving creams, dispersing agents in cosmetics, and more recently in tooth paste.

One of the early U. S. patents, No. 1,543,157, granted to Herzog, June 23, 1925, describes the sulfonation of wool fat in a solution of acetone, for the production of emulsions. Here we have a substance dissolved in a special solvent. Some sulfonations proceed also by means of chlorosulfonic acid, and others use fuming sulfuric acids at various temperatures.

The variety of sulfonated esters is very great. In the aliphatic series alone we may have sulfonates beginning with ethyl alcohol, to those having 30 carbon atoms. The most useful are the sulfonated alcohols having 12 to 18 carbon atoms. They have great soap-like properties. The Gardinols belong to this class.

In the refining of naphthenic base petroleum oils, with sulfuric acid, sulfonates of naphthenic acid are produced. These too have properties similar to the sulfonated alcohols. They are now offered in dry form for the manufacture of emulsions, surface tension depressors, cutting compounds, etc.

U. S. Patents 1,968,793 to 797 inclusive, cover the well known Drene shampoo. These describe the production of fatty alcohols by reducing the esters of fatty acids having more than 8 carbon atoms, and thereafter, the conversion of these alcohols to sulfuric esters. Lauryl, cetyl, oleyl, ricinoleic, stearic and linoleic alcohols and their sulfuric esters are described. All these chemicals are produced from animal and vegetable fats, oils and waxes, and a number of alkyl esters of the fatty acids.

U. S. Patent 2,028,091, covering the production of esters of sulfocarboxylic acids, is most interesting and of great scope. A number of examples are given for making sulfonic acids and their sodium or potassium salts. For instance, Na dioctyl sulfosuccinate is said to have great wetting power. Na and K diamyl sulfomaleate, diamylsulfosuccinate are soluble in water, benzol, alcohol, and gasoline. These and the Na dilauryl, dicapryl, sulfosuccinates, sodium diethoxy ethyl sulfopyrotartrate are jelly-like substances. Those produced as white powders are Na dibenzyl sulfoadipate, dibutyl sod. sulfosebacate, and sod. distearyl sulfosuccinate. Altogether, 28 examples are given, and almost 100 uses are enumerated in this patent.

Research workers comparing one of the sulfonates, Igepon T, with sodium hexametaphosphate, as a solvent for calcium and magnesia soaps, found that Igepon retained its limesoap dispersing properties even on great dilution. They describe two series of experiments in which a liter of water of 40 degrees hardness, containing 1 gram and 2 grams of soap, respectively, was treated with different amounts of Igepon and sodium hexametaphosphate. Four grams of metaphosphate were found necessary to prevent completely the precipitation of limesoap, irrespective of the amount of soap present. About 0.25 gram of Igepon was required for the solution containing 2 grams of soap. The metaphosphate lost its effect as soon as there was insufficient of it to bind the Ca and Mg soaps.

A very useful series is known as Twitchell saponifiers. These consist of sulfoaromatic oleic or stearic acids, of the general formula $R(HSO_3)C_{18}H_{32}O_2$, where R represents the aromatic radical. These are used for decomposing fatty glycerides into fatty acids and glycerin. The fat to be decomposed is boiled for a number of hours with live steam, dilute sulfuric acid, and the reagent which acts as a catalyst. This process is very useful in the soap and candle industries. It produces a higher yield and higher grade of glycerin than by saponifying fats with caustic soda. The process can be used on high grade oils as well as on extracted garbage grease and oil foots.

Recently there have appeared on the market several cleansers containing sulfonates with other detergents. The sulfonates serve as sudsing and penetrating agents, while the actual detergency is effected by trisodium phosphate or other alkalies. One such compound tested by the writer contained 7% sulfonate and 93% trisodium phosphate. It is quite efficient for general cleaning. Where the alkalies would be harmful, as in rug cleaning, the following patented compound is recommended: Alcohol 1 part, 5% acetic acid 3 parts, and a sulfonate 0.08 part.

U. S. Patent 2,091,121 describes a dry cleaner, in the form of a water in oil emulsion, comprising a hydrocarbon dry cleaning solvent, with an aliphatic alcohol dissolved therein, and an oil soluble salt of sulfonated oleyl alcohol, which has been acetylated prior to sulfonation.

U. S. Patent 2,091,704 describes a detergent suitable for use on the human body, comprising a glyceryl ammonium salt of a sulfuric acid ester of a compound of primary and secondary aliphatic alcohols and unsaturated aliphatic hydrocarbons, containing from 10 to 18 carbon atoms in the molecule.

To cite an example of a simple sulfonation, one authority offers the following:

To 45 grams concentrated sulfuric acid, add slowly 50 grams of cetyl alcohol melted at 41° C., with stirring, until a drop of the mixture dissolved in warm water is completely soluble. This requires about 20 minutes' stirring. Care must be taken that there is no appreciable rise in temperature above 35-40°C. Cool to 25°C. Neutralize: to 43 grams of cold water, the sulfonated mix is added little by little with stirring, until a uniformly dissolved paste is formed. Add slowly dry powdered sodium bicarbonate 59 grams, and stir after each addition before adding more. All the sulfonate will now be in the form of a moist

powder. This powder contains considerable sodium sulfate. When dried, it may be extracted with alcohol. Upon evaporation of the alcohol, a fairly pure sulfonate results. A solution of the product made by the writer showed a pH of 7.

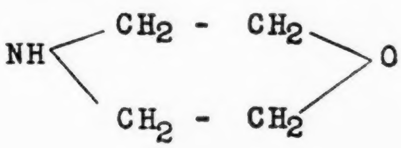
Some analytical data on commercial forms of fatty alcohol sulfonates may be found in the reports of investigations by Biffen and Snell (*Ind. Eng. Chem.: Anal. Ed.* 7, 234-7; 1935).

Morpholine

Possible Uses in Textile Chemistry

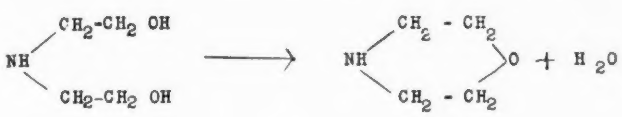
By H. Peters

THE molecule of morpholine is a ring structure made up of an oxygen, a nitrogen atom and four carbon members, viz.:



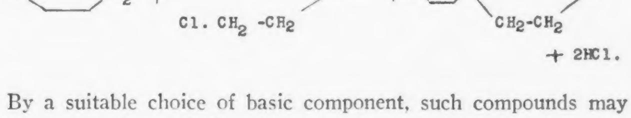
Since the substance has technological value and the patent literature of late has made frequent mention of it, a brief review of its preparation and its uses may not be without interest.

Morpholine results from the dehydration of diethanolamine:

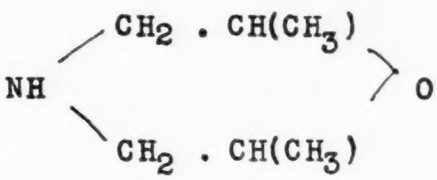


The latter is heated for 4 hours at 170° C. with twice its weight of 70 per cent. strength sulfuric acid. The mixture is cooled and poured into ice and water. The sulfuric acid is removed as sulfate by adding lime and filtering. The alkaline solution is now neutralized with hydrochloric acid and evaporated down in vacuo. Free morpholine is obtainable from the hydrochloride by the addition of the equivalent proportion of sodium carbonate.

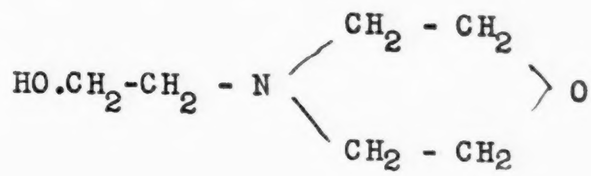
An entirely different line of approach is indicated by the method suggested by a prominent United States firm. The reactants are an amine and a B B′ dihalogenodiethyl ether which combine in the presence of a mild inorganic base such as calcium, magnesium or zinc oxide. A diluent such as water, benzene or toluene may be employed and pressure is applied to maintain the correct temperature. Thus B B′ dichlordiethyl ether and para amino phenol combine to give p-hydroxy-N-phenyl morpholine probably.



By a suitable choice of basic component, such compounds may be prepared as N-phenyl morpholine 3-methyl-4-hydroxy-N-phenyl-morpholine and N-naphthylmorpholine. All these products are said to be of value as corrosion inhibitors, acid inhibitors, rubber anti-oxidants and dye intermediates. Certain substituted morpholines have been found useful in washing textile fibers and in dyeing. An excellent cleansing effect on oily woolen waste is obtained with a mixture of 5 grams soap, and 5 grams 2:6 dimethyl morpholine per liter of liquor. The latter compound is obtained from di-iso propanolamine by condensation in the presence of 70 per cent. sulfuric acid.

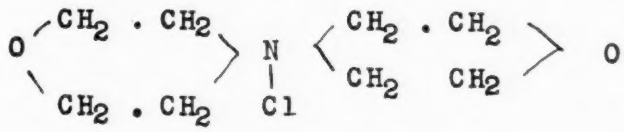


The dyeing of woolen piece goods is more even when morpholine is added to the bath. Woolen hat bodies may be dyed advantageously with Naphthylamine Black 10 B in an acid bath containing N-hydroxyethylamine morpholine.



The phenyl substituted morpholine from aniline and dichlordiethyl ether is recommended for use in a print paste for cotton containing potash, British gum, starch and Indanthrene Violet R.

More recent work on the formation of morpholine from dihalogen diethyl ethers and ammonia, shows that the molecular ratio of ammonia to ether should be at least 3:1 and preferably between 5:1 and 20:1. The chemical reaction which takes place is exothermic and may be done in the presence of water, a monohydric alcohol or a mixture of both. Pressure may be applied during the interaction. At the same time other morpholines may be formed, particularly should a smaller proportion of ammonia be employed, such as bis-morpholinium halides in which the nitrogen atom is pentavalent:



There is a veiled suggestion of preparedness-for-war in the foregoing proposals to make and use dichlor-diethyl compounds. While the present discoveries would seem obviously non-military, the ease with which such derivatives could be converted to the sulfides alias mustard gas is at least worthy of mention.

Mineral Flatting Agent

A new type of mineral flatting agent, Celite No. 165-S, is being marketed by Johns-Manville, New York City, for egg-shell enamels, clear varnishes and lacquers. Product consists of pure white diatomaceous silica, milled to a degree of fineness that gives it highly effective flatting properties. Because of the irregular shapes of the diatom particles it contains, a microscopic roughness of surface is produced which so breaks up and diffuses light as to provide a distinctive, smooth, velvety flat finish rarely obtained with any other material. Even after repeated washings finish is said to retain its desirable qualities.

Strontium and Barium Nitrate in the Field of Fireworks

By H. C. Clauser

Research and Development Dept., Triumph Fusee and Fireworks Co.

Of the numerous chemical compounds used for colored safety and distress signals of different kinds, strontium and barium nitrate are probably the most extensively employed.

Railroads have used for many years red, yellow and green fusees as signals for various specified emergencies. The frequency of the trains and nature of the existing emergency determine not only the color of the flare but also the burning interval of five or ten minutes. The following are typical formulae for the manufacture of railway fusees:

Red Fusees

Strontium Nitrate	71.1%
Potassium Perchlorate	13.1%
Sulphur	11.1%
Sawdust	4.2%
Charcoal	.5%

Green Fusees

Barium Nitrate	68.7%
Sawdust	9.2%
Potassium Perchlorate	8.4%
Sulphur	5.3%
Rosin	4.6%
Kauri Gum	3.8%

Yellow Fusees

Barium Nitrate	47.4%
Strontium Nitrate	23.7%
Sulphur	12.1%
Potassium Perchlorate	9.0%
Sawdust	3.2%
Sodium Oxalate	3.2%
Stearine	1.0%
Charcoal	.4%

In red fusees color of the flame is produced by strontium nitrate. Potassium perchlorate is the oxidizing agent upon which the rate of burning depends. The amount is variable and therefore may be increased or decreased if necessary to increase or decrease the time of burning. The sulfur serves to increase the ignitability of the mixture and the character of the flux resulting from the burning. The sawdust is obtained from hard wood, maple preferably, and is used to give structure to the composition. This requires it to be coarse, approaching what might be termed the chip stage. The charcoal of necessity must be fine and preferably low ash willow charcoal. It serves as a fuel and the percentage used may be varied. An increase of one-half per cent. enhances the rate of burning and adds materially to the vigorous disposal of the flux formed from burning. This point is essential since the formation of flux, if it is not blown away, will cause a chemical chimney to be formed which obscures the flame.

Figure 1. Safety Railway Fusees.

The addition of lithium carbonate to the extent of two to five per cent. greatly improves the color of red flares. Lithium carbonate is non-hygroscopic and its price is not prohibitive due to the effect produced by the addition of relatively small amounts. Flame coloration produced by volatile strontium compounds contains a large percentage of green and orange, which are to a large extent neutralized by the monochromatic red of lithium salts.

Green fusees are produced by the substitution of barium nitrate for the corresponding strontium salt.

Yellow fusees are produced by combining barium and strontium nitrates with sodium salts. The proportions are set forth in the formula for yellow fusees.

The ingredients for the desired colors must be absolutely dry, of a standard fineness and intimately mixed to secure a homogeneous mass. The composition is then carefully loaded mechanically in Kraft paper tubes of suitable diameters.

Marine Signals

Barium and strontium nitrates and non-hygroscopic lithium salts are chiefly used for the production of emergency and distress signals in the various fields of navigation. The red stars and flares of marine ship rockets depend solely on the use of strontium nitrate, strontium carbonate and non-hygroscopic salts of lithium for their red flame. The candle power is increased by the addition of fine aluminum or magnesium metal powder. However, the candle power when it exceeds 30,000 reduces the intensity and quality of the red. If a green flare is desired, barium nitrate is generally used. Barium nitrate is also used to produce an intense white light in connection with different proportions of metallic magnesium and aluminum.

Figure 2. Left to right—Items 1 and 2, Red Star Parachute. 3, White Star Parachute. 4, Pistol. 5 and 6, Aircraft Parachute Flare. 7, Three Star Grenade. 8, Wind Flare. Illustrations, courtesy Foote Mineral Co.

Aviation Signals

United States Army and Navy aircraft, as well as commercial aircraft, are provided with emergency landing signals. For these the following are used: Red Star Parachute, White Star Parachute, Aircraft Parachute Flare, Wind Flares and Floatlights for the aviator flying over water. These flares are held in racks in the cockpit of the plane and a pistol is provided to project the flare well beyond the plane.

Signals 1, 2 and 3 are specifically designed for emergency landings. The pistol can be loaded with one hand, as the signal adapts itself to muzzle loading. The small white star parachute is shot into space while reconnoitering at night. The red star signal is used to indicate distress. The Aircraft parachute flare is used for emergency landing. This flare produces a dazzling white light for one minute with a candlepower in excess of 125,000.

The main ingredient in the small red parachute flare is strontium nitrate, plus an oxidizing agent, as for example, potassium perchlorate, sulfur, aluminum and magnesium metal powders. The white flares are loaded with a composition, chiefly barium nitrate, an additional oxidizing agent, and the metallic elements magnesium and aluminum subjected to a pressure of five to ten tons. Signal 8 in Figure 2 is a wind flare used by explorers of the Antarctic. It is designed for release by hand after a friction surface is rubbed over a primer surface. Five seconds after ignition, a red flare evolving red smoke is released, suspended from a parachute.

Military Signals

In Figure 2, item No. 7 is a naval submarine signal. A similar signal is used by the army. The most important type of military signal is the red and green star, three in number, which are attached to an asbestos string, suspended from a parachute. The United States Army fires this signal into the air with a discharger attached to a Springfield rifle. The Navy launches it under water from a submarine with compressed air. It is buoyant, and as it reaches the surface, a grenade is shot into the air, releasing a parachute bearing a chain of three red or green stars. Typical formulae for each star are as follows:

Red Star		Green Star	
Potassium Perchlorate	63.0%	Barium Nitrate	75.5%
Strontium Nitrate	19.5%	Aluminum	21.8%
Shellac	15.5%	Sulphur	2.7%
Rosin	2.0%		

These formulae can be varied for brilliancy of color and variation of burning time.

The general use of barium and strontium nitrates in the formulae given in this article is apparent. The preference is given to potassium perchlorate over the usual potassium chlorate. The perchlorates are more stable and less sensitive than the chlorates, even though they contain a large percentage of oxygen. This is natural when the nature of free chloric and perchloric acid is taken into consideration. Chloric acid is more unstable than perchloric acid, and this instability is reflected in its salts. Mixtures of perchlorates with reducing agents are not only less sensitive to shock, but in addition the free acid does not produce the same dangerous decomposition. Sulfur is omitted wherever it is possible, chiefly for the avoidance of potential manufacturing hazards. Screening of sulfur causes it to become statically charged and it is therefore preferable to use substitutes.

Presence of a chloride in the mixtures intended to produce a red or green flame coloration will accentuate color of the flame and produce the same beneficial effect in color obtained by use of barium chlorate and potassium chlorate. For this purpose, the chlorides of strontium or barium are preferable. Uniform degrees of fineness, dryness and purity are most essential. Barium and strontium nitrates should be at least 99.5% pure and virtually free from sodium.

The layman usually associates the science of pyrotechnics and the fireworks industry in general with our Fourth of July firecrackers, Roman candles and salutes, or with colorful and spectacular carnival displays. Actually the consumption of these items is small in both volume and importance, compared with the applications of the pyrotechnic art to the manifold safety signals used daily in every mode of transportation and the potential possibilities of their consumption in case of national emergency.

Abstracted from "Foote-Prints," June, 1937.

Rubber Concrete

Combining the properties of both concrete and rubber, a material called Ucrete has been developed by F. Hulse and Company, Ltd., Woodlesford, Leeds, England. Advantages claimed for it over ordinary concrete and rubber include its waterproofness, the fact that it sets like cement and is not dependent upon evaporation, is dustless and has good wearing properties, has strong adhesive properties, and does not form brittle objects when molded.

Permanent Water-repellent Finish

Great interest is being shown abroad in a new textile finish called "Velan PF," product of Imperial Chemical Industries, Ltd. It is claimed to be the first finishing agent conferring upon materials water repellency permanent to washing, laundering, and dry-cleaning, this property being obtained by a chemical change in the nature of the silk, rayon, wool, cotton or linen. The material is also claimed to enhance the softness and suppleness of all types of textile materials. Booklet on subject may be obtained from company at Milbank House, London, S. W. 1, England.

Improved Water Varnishes

Water varnishes prepared from ordinary shellac by means of soda, ammonia, borax or sodium silicate, usually suffer from the faults of dark coloration and poor film forming properties. Recent work by Bhattacharya and Verman at the London Shellac Research Institute, however, has indicated that useful products can be made by the utilization of shellac dispersed in solutions of sulfurous acid or bisulfites. When employing wax-containing shellac, the solutions are turbid but can be clarified by filtration. On heating or the addition of electrolytes, the shellac resin is precipitated, although in a modified form. In liquid sulfur dioxide itself, shellac is insoluble, the presence of water being essential.

Bisulfite Treatment

Shellac dissolved direct in hot solutions of bisulfites gives stable dispersions which are not easily coagulated by acids. The bisulfite treatment can also be effected in the cold by decomposing a solution of shellac in aqueous alkali with sodium bisulfite solution and then precipitating with salt or acids. After washing out the excess salt, the residual shellac is easily water-dispersible. The dispersions in sulfurous acid gelatinize on prolonged standing, probably mainly owing to coagulation by the sulfuric acid itself produced by oxidation. Additions of glycerin or ethanolamine retard the oxidation. Shellac bleached with chlorine is much less soluble in sulfurous acid and bisulfites. The solvent action of aqueous sodium bisulfite on shellac is very small at ordinary temperatures, but becomes vigorous between 60° and 80° C., the solution so made being more stable to heat and storage than solutions in sulfurous acid or in bisulfites made by the cold method. On the other hand, the film left on drying is soluble in water, while the film left from a sulfurous acid solution is insoluble. On heating, however, the water-soluble film becomes hard and tough and resistant to water, acids, alkalis, and solvents. Excess sulfur dioxide from a dispersion of shellac in sulfuric acid can be removed by careful air blowing, while stabilizing agents for the solution have been found to include phenol, glycerin, sodium thiosulfate, pyridine, urea, ammonium nitrate, etc. A mixture of half per cent. phenol and half per cent. glycerin on the weight of the shellac has been found to confer stability for over four months.

Dispersions of shellac in sulfuric acid are suggested as ingredients of furniture polishes, while the solubility of shellac in sodium bisulfite is put forward as a ready means for the detection of shellac in the presence of rosin. The *Chemical Trade Journal*, Aug. 27, '37, p. 186.

Prepared Monthly by the U. S. Industrial Chemical Co., Inc.

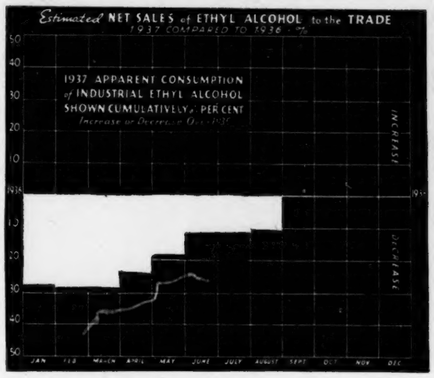
A PRODUCT OF U.S.I.

SOLVENT NEWS

Reg. U. S. Pat. Off.

A PRODUCT OF U.S.I.

November ★ **A Monthly Series of Articles for Chemists and Executives of the Solvent-Consuming Industries** ★ **1937**



Apparent consumption of industrial ethyl alcohol from Jan. 1 to August 31, 1937, was 33,757,000 wine gallons. This is 11.0 per cent less than during the same period in 1936 when 38,034,000 wine gallons were consumed.

Revoke S.D. Formulas 1-A, 15, 44-A; Effective Jan. 1

WASHINGTON, D. C.—Specially denatured alcohol formulas 1-A, 15, and 44-A will be revoked, effective January 1, 1938, it has been announced by Deputy Commissioner of Internal Revenue, Stewart Berkshire.

This move is understood to be in harmony with the department's efforts to reduce the number of specially denatured alcohol formulas and simplify the denatured alcohol structure.

A survey of the trade is reported to have revealed that the above formulas are used very little and that their purpose is adequately served by other approved formulas.

Form Dyes In Lacquer To Improve Light-fastness

Successful application of a method for forming dyes within a lacquer rather than adding the dyestuff to the solvent is claimed in a recent German patent. Drawing upon methods used in the textile industry, the inventor of this process adds to the lacquer base a leuco base and chromic acid or its salts in solid form, and heats gently to produce a light-resistant complex chromium dyestuff.

A typical example of the process is given as follows: One hundred parts of a lacquer which consists of 100 parts of nitro-cellulose, 100 parts of normal butyl alcohol, 150 parts of ethyl lactate, 250 parts of butyl acetate, 375 parts of ethyl alcohol, 20 parts of triphenyl phosphate and 5 parts of adipic acid ester are used to dissolve 0.5 parts of the leuco base of Erichrome Azurol B (Color index number 720). The solution is developed with 0.25 parts of sodium bichromate and 0.25 parts of oxalic acid by gentle heating. A blue lacquer of excellent light resistance is obtained, the patent claims.

Don't Miss the U. S. I. Exhibit at Booth 90

EXPOSITION OF CHEMICAL INDUSTRIES

Grand Central Palace, New York

December 6 to 11, 1937

Chemists Report Diethyl Carbonate In New Process for Dye Synthesis

Claim Hitherto Unknown Reaction for Making Crystal Violet And Other Dyes Eliminates Need for Costly Chemicals

What is to many chemists still an unusual organic chemical, Diethyl Carbonate, a product which has for some time been manufactured exclusively in this country by the U. S. Industrial Chemical Co., Inc., has recently shown signs of increasing usefulness.

One of its first known applications was in the production of a highly specialized lacquer, used for coating radio tube elements. In this case, the comparatively high cost of the chemical in relation to other solvents was compensated for by its absence of acidity and because its dissociation products are entirely inert.

A recent review of the scientific literature has brought to light a totally new application of Diethyl Carbonate, in which the carbonate structure, and not the solvent power, of the product plays the important part. Briefly, interesting possibilities seem to lie in the synthesis of triphenyl methane dyes.

Previous Methods Expensive

Declaring that they have utilized a "hitherto unknown reaction to condense the halides of certain N-di-substituted amino aryl compounds with compounds containing the carbonyl group," Avery A. Morton, Waterton, and Joseph R. Stevens, Cambridge, Mass., claim in U. S. Patent 2,029,830 a simple and inexpensive method for preparing dyes, of which malachite green and crystal violet are examples.

Previous methods of preparing these dyes, it is pointed out, have a disadvantage either in the expense of the ingredients or in the difficulty of carrying out the reaction.

As an example of their method, the inventors state that they first make a halide deriva-

(Continued on next page)

Suggest Standardization For Packaging Materials

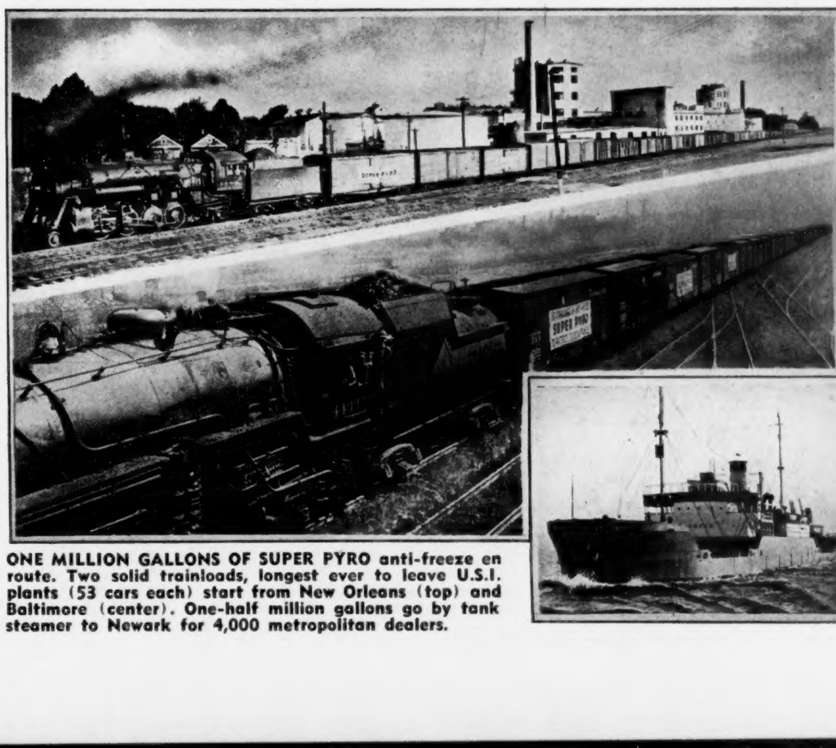
Standardization of testing methods for moisture-resistant packaging materials is suggested by the Bureau of Standards in its *Technical News Bulletin.* A great need exists for an adequate method to test the permeability to water vapor of such materials as paint and varnish films, cellulose wrappings and rubber compounds, the Bulletin reports.

Many minor modifications are made in the methods now used for this purpose, the article continues. Test periods range from 2 to 2000 hours; temperatures from —14 to 45 deg. C; vapor pressure differences from 0 to 72 mm. of mercury and specimen areas from 0.15 to 323 sq. cm. Variations also occur in the method of attaching the specimen to prevent leakage, the movement of air, the approach to the steady state and the units in which results are expressed.

Name Kennedy, Grigsby and Connell To New Posts in Alcohol Tax Unit

NEW YORK, N. Y.—Effective September 16, 1937, Mr. W. H. Kennedy was appointed to the position of Assistant Deputy Commissioner, (Permissive), of the Alcohol Tax Unit, Bureau of Internal Revenue; Mr. E. G. Grigsby was made Technical Advisor to Deputy Commissioner Berkshire; and Mr. L. B. Connell was made Supervisor at St. Paul.

Anti-Freeze Protection for 540,000 Automobiles



ONE MILLION GALLONS OF SUPER PYRO anti-freeze en route. Two solid trainloads, longest ever to leave U.S.I. plants (53 cars each) start from New Orleans (top) and Baltimore (center). One-half million gallons go by tank steamer to Newark for 4,000 metropolitan dealers.

NOVEMBER ★ SOLVENT NEWS ★ 1937

Chlorides Used To Disperse Titanium Oxide In Alcohols

WASHINGTON, D. C.—Methods of dispersing titanium dioxide in alcohols by means of small amounts of acid-reacting halides (aluminum chloride, titanium tetrachloride, ferric chloride and others) are described in a patent which has just been granted here.

Equally applicable to primary, secondary or tertiary alcohols—according to the patentee—the methods are advanced as being particularly suitable for alcohols such as methyl, ethyl, isopropyl, etc.

As a typical example, 50 grams of aluminum chloride, 10 kilograms of ethyl alcohol and 20 kilograms of titanium oxide are milled together in a ball mill for about an hour. Suspensions made from this paste or according to other methods outlined, it is declared, settle out slowly over a long period of time and are easily shaken into suspension again.

It is pointed out that these and similar suspensions are well adapted to the manufacture of inks, shoe-polish and other materials where quick-drying, non-aqueous suspensions are demanded.

Use Aluminum Powders In Heat-indicating Paints

BERLIN, GERMANY—Renewed interest in heat-indicating paints may be aroused by a recent report here that suitably treated aluminum powders undergo a sharp change in color at moderately high temperatures.

The new process is reported as involving mordanting of the aluminum powder with tannin, followed by treatment with oxalic acid and, dyeing with suitable basic dyes.

This discovery is considered important by many because it is expected that the aluminum powders will be less expensive than the mercuric compounds commonly used in these paints. In addition, it is pointed out that whereas the mercuric compounds undergo a reversible color change, the aluminum powder method can be modified to give both reversible and non-reversible colors.

Identification of blown or sulfonated castor oils may be made microscopically if the oil is first treated with a saturated solution of potassium hydroxide in normal butyl alcohol, a recent report states. Characteristic crystals are said to be formed.

Higher Foundry Output Adds To Curbay Demand

CLEVELAND, Ohio—Although there were 9% fewer foundries in operation this year than in 1930, total production for the first half of 1937 compared favorably with that of 1929 and in some cases was as high as 124% of the 1920-1929 averages, data released here indicates.

This year marks the twentieth anniversary of U. S. I.'s Curbay Core Binder. This core binder is now standard in many foundries where it has won lasting acceptance because of its easy miscibility with sand and its property of producing cores with porous, glazed surfaces after baking. Another important advantage is its comparatively low cost.

Diethyl Carbonate In Dye Synthesis Process

(Continued from previous page)

tive of the di-substituted amino group, such as parabromdimethylaniline.

The preparation of crystal violet, according to the patent, is as follows: Three parts of sodium is placed in 100 parts of dry benzene, to which there is added a mixture of three parts diethyl carbonate and ten parts of parabromdimethylaniline.

This, Morton and Stevens continue, is preferably heated in a refluxing apparatus until all of the sodium has reacted. The mixture is then decomposed by the addition of water, after which the benzene is evaporated. The solid residue remaining is filtered off and converted to crystal violet by treatment with dilute hydrochloric acid.

Other Carbonyl Compounds

By this method the inventors claim they easily obtain a yield of more than 30 per cent. Another factor which, they point out, contributes to the economy of the method lies in the fact that their reaction employs a molecular ratio of three parts of the halide compound to one of the carbonyl compound.

In addition to diethyl carbonate, other carbonyl compounds such as diethyl oxalate, diethyl phthalate and chlorethyl formate (ethyl chlorcarbonate) [Ed. note: All manufactured by U.S.I.] may be used to prepare other dyes with similar substantial reductions in costs, according to the patentees.

TECHNICAL DEVELOPMENTS

Further information on these items may be obtained by writing to U.S.I.

A new synthetic drying oil, similar in some respects to chinawood oil, has been announced. Advantages reported are high waterproofness, excellent color retentivity and resistance to premature jelling during kettling. It is said to be compatible with common varnish ingredients and lacquer solvents. **(No. 31)**

U S I

Phthalate-treated titanium dioxide, now announced for commercial production, is said to combine higher resistance to chalking and higher tinting strength than any other white pigment. Typical applications for its outstanding exposure durability are in tinting finishes of the N.C. lacquer or short-oil oleoresinous type, according to the manufacturer. **(No. 32)**

U S I

A new caulking compound which can be applied with either tool or gun was announced recently. The manufacturer states that it is made of rubber, linseed oil and asbestos, which combination makes possible a tough, elastic, air-tight and water-proof compound. **(No. 33)**

U S I

A rust-proofing process recently announced is said to produce an effective anchorage on steel for a subsequent protective finish. It is especially recommended by the developers for use on the inside of steel barrels and containers prior to the pitching process. **(No. 34)**

U S I

Plastic molding powder of the cellulose acetate type combined with plasticizers and coloring ingredients was announced recently. The manufacturer states that this powder can be used in either compression or injection molding and is available in a number of grades. **(No. 35)**

U S I

A new cold-water, flexible adhesive compound is said to mix readily with water-soluble pastes and glues, prevent foaming, and impart flexibility to other adhesives. Suggested uses include labeling on tin or glass. **(No. 36)**

U S I

A new synthetic wax, said to be similar in some of its properties to carnauba is on the market. It is lower in acid number, saponification value and iodine number and is available in shades from gray to white with melting points from 75 to 88 deg. C., the manufacturer states. **(No. 37)**

U S I

Two new types of phenolic resins have been introduced. One is said to speed the bodying of substituted oils in paints and varnishes. The other, according to the manufacturer, does not lose its drying speed as rapidly as other resins in short or medium-oil length vehicles. **(No. 38)**

U S I

The level of pulverized material in bins and hoppers is shown by a new device recently marketed. This dry-measurer is described as a dust-tight canvas diaphragm which actuates a mercury switch through a counterweighted lever. **(No. 39)**

Specialty Makers at Metals Exposition

Prominent Companies Display New Products at Atlantic City Convention—Lever Brothers Refused Review of "Rinso" Patent Suit—National Carbon, U. S. I. Announce Anti-Freeze Campaign Plans—Other News of the Chemical Specialties Field—

The Metals Exposition, Atlantic City, Oct. 18 to 21, drew many industrial chemical specialty manufacturers, a number of companies exhibiting. The J. B. Ford Sales Co., Wyandotte, Mich., displayed a complete line of specialized metal cleaners for plating, lacquering, enameling, japanning, and vitreous enameling. Wyandotte burnishing compounds, Wyandotte neutralizers for neutralizing acid after pickling operations, and Wyandotte specialized cleaners for cleaning railway equipment, airplane, and automotive equipment were also shown. Ford representatives attending included B. N. Goodell, manager, industrial department; W. M. Cole, assistant manager of the department; W. B. Davison, manager, Philadelphia office; L. D. Dodson, manager, N. Y. City office; H. J. Perry, industrial representative, Philadelphia; and C. L. Southwick, industrial representative, Detroit.

B. D. Sanderson, sales manager, Maas & Waldstein, assisted by sales representatives K. W. Berger and E. R. Van Der Hoef, were in charge of a visual presentation of product finishes engineered for specific purposes by the M. & W. Company.

Park Chemical, Detroit, showed a complete line of hardening and heat treating materials, including liquid carburizers, polishing and buffing compounds and grain cements for setting up buffing wheels. In attendance were J. N. Bourg, vice-president and general manager, J. C. Thompson and F. W. Faery.

American Cyanamid's exhibit featured Aero case-hardening materials, cyanides, etc. Photographs of actual installations were shown. Among the Cyanamid representatives were M. J. Wixson and R. H. Landis of the N. Y. office; George G. Johnston, Detroit representative; J. S. Meyer from the Stamford laboratories; T. E. Holder from the Chicago office; and F. F. Dubbs from the Philadelphia office.

Du Pont headquarters were at the Ritz Carleton. The Grasselli Division exhibit was largely given over to the new "Zin-o-lite" plating process and the bright zinc finish. Two additional booths held displays of du Pont chemicals and the R. & H. Division line of cyanides. Among the du Pont men present were C. Hoff, Wilmington; Howard Smith of the Philadelphia office; Major Dufault, Ralph McCahn and "Bart" Sheehan of the N. Y. office; and W. Schneider, plating expert; also J. N. Haus, Philadelphia, district manager; F. L. Dewey, advertising manager of the Grasselli Division, and J. J. Landy, advertising manager for the R. & H. Division.

Among the other exhibitors were Air Reduction, Linde Air, and Dow Chemical, the latter featuring Dowmetal. The Norton Co.'s booth with a variety of abrasive products was a highlight of the exposition. H. K. Clark, vice-president and sales manager, and W. R. Moore, sales manager of the abrasive division, headed the Norton contingent.

C. Gibson, vice-president of sales, and H. E. Henriques, assistant sales manager, were in charge of the Air Reduction booth. S. F. Courter and F. Tone were in charge at the Carborundum Co.'s display. At the E. F. Houghton Co. booth a large delegation from the sales force was headed by G. W. Pressell, executive vice-president, and Dr. R. H. Patch, vice-president.

Reports from chemical exhibitors indicate that despite the generally slower business pace, attendance was excellent, keen interest was shown in displays and a satisfactory business done by the majority of companies.

Lever Refused Review

The U. S. Supreme Court on Oct. 18th refused to review the granular soap patent controversy in which a lower court held that in selling "Rinso," Lever Bros. Co. infringed the Lamont patent owned jointly by Colgate-Palmolive-Peet and P. & G.

The Federal District Court of Indiana held that the patent was not infringed and that it was not valid unless limited in a certain manner, but the 7th Circuit Court of Appeals reversed this decision, removing the limitations on the patent and holding that it was infringed by Lever, and directed an accounting for infringements covering a period of 7 years.

Lever sought a review by the Supreme Court on the ground that the Circuit Court had nullified the findings of fact of the trial court, contending that questions of inventorship should be decided by the court which heard the witnesses. Lever also declared that the patent in controversy covered a soap powder consisting of more than 50% hollow globules and less than 15% of soap dust and that the judges of the Circuit Court decided there was infringement by examining a single sample of "Rinso" through a magnifying glass instead of using a scientific method. The U. S. Supreme Court assigned no reasons for refusing to review.

Anti-Freeze Campaigns

"Old Man Winter" is being heralded by the anti-freeze producers. Timing insertions with local weather conditions, National Carbon is launching an extensive campaign for Eveready Prestone. Four hundred newspapers and 20 consumer magazines will be used. Schedule calls for 3 insertions in each newspaper, with 756-line copy being used in the larger media and 600-line copy in smaller publications.

U. S. I. has released a number of details of its '37 sales and advertising program for Super Pyro Anti-Freeze. Sales are expected to reach 6,000,000 motorists as against 4,600,000 in '36 and 3,750,000 in '35. In '33 dealers sold Super Pyro to but 800,000 motorists. Through billboards, space in 6 of the leading national weeklies, station displays, etc., company plans to reach 95% of all car owners in the cold areas. Nearly 10,000 colorful billboards of striking design, featuring the taming of "Old Man Winter" by a circus belle will appear in over 200 cities and towns. *Life, Liberty, Collier's, Country Gentleman, Saturday Evening Post,* and the *American Weekly* are the national media chosen.

Other Merchandising Notes

Popular Brands, Inc., following a successful introductory campaign for Pop Cleanser in upper N. Y. State, will invade the Metropolitan area with an advertising campaign. Introductory campaigns are now being undertaken in Chicago and Philadelphia territories. Pop, a soapless cleanser, it is reported, was formulated by Cecil Rhodes, nephew of Cecil Rhodes, "the Empire Builder."

The Boraxo poster, showing a grimy hand reaching for a can of Boraxo, was awarded third prize in a recent contest sponsored by Outdoor Advertising, Inc. Boraxo is a Pacific Coast Borax product. Robert T. Stewart, McCann-Erickson, Inc., did the art work.

Fleming Manufacturing has started a large campaign in New England emphasizing a money back guarantee for its Fram oil and motor cleaner.

Specialty Exports Rise

Several striking gains were recorded in August exports in the specialty group, the total of which increased in value from $1,800,000 to $2,349,000. In this classification shipments of plastic products increased from 1,176,000 lbs. to 2,293,000 lbs. and insecticides, disinfectants, deodorants, and similar products from 1,744,000 to 3,267,000 lbs.

Celebrates 50th Birthday

The Philadelphia Paint, Varnish and Lacquer Association celebrated its 50th birthday with a dinner-dance on Oct. 20th at the Bellevue-Stratford.

F. T. C. October Rulings

Federal Trade Commission orders Babiglo Co., 37 W. 20th st., N. Y. City, to cease use of words "olive" or "olive oil" alone or with other words to describe a soap composed in part of olive oil and in part of other oils and fats, unless there conspicuously appears in immediate conjunction with these words other designations truthfully describing the contents of the soap.

John Puhl Products, 3640 W. Pershing Road, Chicago, selling "Little Bo-Peep," a laundry preparation, will stop advertising that its product contains "Oehme" or any other ingredient alleged to be found only in such product, or that "Oehme" or any other ingredient of the preparation possesses remarkable cleansing properties or is capable of doubling the cleaning power of the product. Other representations to be discontinued are that the use of "Little Bo-Peep" in the laundering of hose will double its life, and that its use in the washing of blankets and woolens will prevent shrinkage.

Emsee Manufacturing Co., Monroe, Mich., will cease representing that Slick Universal Cleaner cleans everything from dishes to rugs, walls or automobiles, and that laundry managers have found that one pound of the product equals 5 pounds of soap and building managers have adopted it for all building cleaning requirements. Company also will refrain from advertising that the product dissolves dirt, neutralizes grease and kills germs.

Seek Increased Lubricant Sales

The National Lubricating Grease Institute, at its 5th annual convention, held in Chicago, Oct. 4-5, laid definite plans for promoting increased use of greases and lubricants. New officers elected include George W. Miller, American Lubricants, Inc., Buffalo, as president; M. R. Bower, Standard of Ohio, as vice-president; Ernest V. Moncrieff, Swan-Finch Oil, as secretary-treasurer.

Graphite Paint Specifications

A second draft of the proposed Federal Specification for ready-mixed black graphite outside paint has been issued by the Federal Specifications Executive Committee. Copies may be obtained from E. F. Hickson, chairman of the technical committee on paints, National Bureau of Standards, Washington.

Wool Fabric Sterilization

Workers in the Department of Agriculture are said to have discovered a process for sterilization of wool fabrics without damaging the fiber. While it has been tried as yet only under laboratory conditions, the method is believed to have practical commercial possibilities. Next step will be tests in dry-cleaning and other industrial plants.

No Hypochlorite Investigation

U. S. Tariff Commission on Oct. 7th dismissed without prejudice an application for an investigation of the foreign and domestic costs of producing calcium hypochlorite, now dutiable at 25% ad valorem. Application was filed Sept. 1, '36, by Mathieson Alkali and Pen-Chlor, Inc., Philadelphia, looking to an increase of duty under the flexible provision of the tariff law.

Deaths of the Month

John Charles Wolke, 45, executive sales manager, L. Sonneborn Sons, Inc., N. Y. City, died Oct. 18 at Upper Montclair after a long illness. He started with Standard Oil as an office boy in '06. After 25 years with this company during which he held several important executive positions, he joined the Sonneborn organization in '32. He is survived by his wife, 3 sons, 2 daughters, and his parents.

Harry M. Riddle, 72, president, Asbury Graphite Mills, died at his home in Asbury, N. J., Sept. 29. He started his company in 1895.

Personnel Changes

Louis S. Hirsch, for many years vice-president and manager of B. P. Ducas Co., N. Y. City, joins the sales division of the Richards Chemical Wks., Jersey City. He will specialize in the development and sale of new specialties for the paper, leather, and textile fields and new cleaning materials for the metal finishing industry.

Joseph H. Lee joins Shell Union Oil as assistant manager of the lubricating department, succeeding A. T. Doane, who becomes sales manager of the company's eastern division with Boston headquarters.

Raymond E. Williams, formerly with James B. Horner & Co., essential oil house in N. Y. City, is now with General Drug in the perfume raw material division.

Valentine Co., N. Y. City, appoints Arthur L. Clark, manager of the aeronautical division of the company.

New Construction

Detroit Rex Products, 13005 Hillview ave., Detroit, will erect a new plant which will provide approximately 30,000 sq. ft. The Austin Co., Cleveland, is the builder. Increased demand for solvent degreasing machines and degreasing solvents has made this expansion program necessary.

Discusses Lacquers For Textiles

Conrad Frye, Maas & Waldstein, Newark, discussed application of lacquers in textile and allied fields before the N. Y. Section of the American Association of Textile Chemists & Colorists at the October meeting.

Specialty Co. News Briefs

Chipman Chemical, Bound Brook, N. J., purchases 500 tons of "Microsulfur" for shipment to the Florida citrus belt. Microsulfur is produced at the sulfur recovery plant of Portland Gas & Coke, Portland, Ore. Product is fine in texture and is employed for both dusting and spraying.

Problems of rezoning have not as yet been completely ironed out by Fritzsche Brothers, N. Y. City essential oil house, who plan to take over and develop the Kleber property at Clifton, N. J. Company intends to erect a new plant on the property.

Du Pont will establish a new production unit for industrial finishes at Fort Madison, Iowa.

Bopf-Whittam Corp., manufacturer of wool fat products, is now located in its newly constructed plant at Linden, N. J.

S. B. Penick & Co., N. Y. City, botanical drugs, etc., purchases the 72-year-old firm Murray & Nickell Manufacturing Co., Chicago. New acquisition will be merged with the present Chicago branch of Penick.

N. I. Malmstrom Co., Brooklyn, manufacturer of lanolin and wool greases, is now represented in Chicago, Minneapolis, and Kansas City territory by Thompson-Haywood Chemical. Mr. Malmstrom returns from his European trip early in November.

Cannibal Drain Pipe Cleaner is a new addition to the line of John Sunshine Chemical, Chicago.

Thomas Hersom & Co., manufacturer of soap, soap powder, fertilizers, insecticides, and heavy chemicals, located at New Bedford, Mass., will now be conducted as the Allen Hersom Co.

The Curran Corp. is moving the Somerville manufacturing plant to the Dowling Bldg., 6 Pleasant st., Malden, Mass. Company produces "Gunk," a special cleaner for industrial purposes.

International Printing Ink officials see prospects of a $50,000,000 printing industry in '38 which should boost sales of printing ink and other chemical specialties used in this field.

Cabell Manufacturing, 220 17th st., Huntington, W. Va., is moving to the adjoining building, following a fire on Oct. 5th. Company produces insecticides.

Arthur Srebren, formerly associated with Murray & Nickell Manufacturing, purchases a major interest in Associated Chemists, Inc., 6238 S. Ashland ave., Chicago. Company has a complete line of raw materials for insecticides, specialties, and offers pyrethrum-derris products. It is reported a new plant will soon be opened at Spring Grove, Ill.

Steel Production & Chemical, 305 Merchants National Bank Bldg., Indianapolis, is incorporated to manufacture tar, asphalt, cement, etc.

Chemical Specialty Patents

Fluid cement comprising asphaltum, benzol, powdered rosin, powdered dehydrated lime, zinc oxide, powdered whiting, and ground rubber. No. 2,092,600. Wilbur O. Dayton to Whitday Co., both of Chicago, Ill.

Composition for sealing and impregnating; using first asphaltum, caustic soda, and rosin; second, rubber in a solution of ammonium and water, wood flour and dehydrated lime. No. 2,092,601. Wilbur O. Dayton to Whitday Co., both of Chicago, Ill.

Method polishing wax; first applying wax to surface, then applying to surface of wax a dry, comminuted vegetable material, then rubbing until desired polish is produced. No. 2,092,686. Mack Wilson, Washington, D. C., one-half to Jos. E. Stacey, Dorchester, Mass.

Process for rendering textiles water-repellent, by treatment with an emulsion of an anhydride of high molecular fatty acid in an aqueous solution of a stable soap. No. 2,092,702. Alexander Nathansohn, Berlin, Germany, to Studiengesellschaft fur Faserveredelung m. b. H., Berlin.

Fur bleaching composition comprising alkaline solution of hydrogen peroxide containing a soluble oxalate. No. 2,092,746. Norman P. Arnold, Niagara Falls, N. Y., to du Pont, Wilmington, Del.

Manufacture cigarette paper which has been impregnated with composition of a resinous polymer. No. 2,092,817. Daniel E. Strain to du Pont, both of Wilmington, Del.

Detergent composition containing a detergent having a cleansing action and an alkali metal salt of tetraphosphoric acid. No. 2,092,913. Augustus H. Fiske, Warren, R. I., to Rumford Chemical Works, Rumford, R.I.

Production improved detergents from neutral salts of an organic derivative of a strong polybasic mineral acid. No. 2,092,943. Hans G. Vesterdal, Elizabeth, N. J., to Standard Oil Development Co., corp. of Del.

Manufacture soil improvers with a high interchanging power for bases; using aluminosilicates of bivalent bases in process. No. 2,093,047. Joost Hudig, Wageningen, and Nikolaas Hendrik Siewertsz van Reesema. Delft. Netherlands.

Manufacture paint composition which remains liquid at ordinary temperatures; using a siccative oil, barium hydrate, water, a solvent, and pigments. No. 2,093,073. Camille Deguide, Aisemont, near Fosses, Belgium, to Societe de Recherches et d' Applications Chimiques (Sorac) Societe Anonyme, Brussels, Belgium.

Filtering composition. No. 2,093,090. Fred W. Manning to Fred W. Manning Co., Ltd., both of Los Angeles, Calif.

Production an ink repellent amalgam layer on a printing plate by a chemical process involving use of powder nitrate of silver, nitrate of mercury, and glycerin. No. 2,093,098. Heinrich Renck, Hamburg, Germany.

Adhesive for self-sealing envelopes consisting of rubber latex, an adhesive substance, and powdered mica. No. 2,093,105. Ivan Wolff, New York City.

Manufacture leatherboard, subjecting leatherboard containing iron-tannate inks to action of solution containing an arsenic acid. No. 2,093,290. Herman W. Richter to Geo. O. Jenkins Co., both of Bridgewater, Mass.

Manufacture blue prints; coating sheet with light sensitive substance consisting of a reducible ferric salt and a ferri-cyanide, treating sheet with a developer comprising an acid reacting water solution of a ferrocyanide; in last step using an oxidizing solution. No. 2,093,421. Clyde A. Crowley, Chicago, and Geo. H. Goodyear, Evanston, Ill., to Huey Co., Chicago, Ill.

Production bituminous or tarry materials; using sulfuric acid in process. No. 2,093,450. Felix Jacobsohn, Berlin, Germany.

Production water varnish having an enamel surface and insoluble after drying; comprising an aqueous ammoniacal solution containing casein, ricinoleic acid, sandarac resin, and zinc carbonate. No. 2,093,487. Fernand Frederic Schwartz, Paris, France, to Cela Holding, S. A., Luxemburg, Luxemburg.

Water varnish having an enamel surface and insoluble after drying; comprising reaction product of an ammoniacal aqueous solution containing a resinous material, a higher fatty acid, a metallic compound, and a material of the class of cellulose and methyl-cellulose. No. 2,093,488. Fernand Frederic Schwartz, Paris, France, to Cela Holding, S. A., Luxemburg, Luxemburg.

Composition for cleaning polished scratchable surfaces having composition: whiting, feldspar, sodium salt of the sulfuric acid ester of oleic amide, and water. No. 2,093,660. Malcolm E. Rockhill, Washington, D. C.

A reusable, absorbent cleansing cloth alkaline in reaction and maintained moist by glycerin; cloth being impregnated with a detergent composition free from soap and oil consisting of: trisodium phosphate, glycerin, and borax. No. 2,093,824. Paul A. Woronoff, St. Davids, Pa.

Mineral lubricating textile oil, having incorporated therein a monohydric aliphatic alcohol containing at least 12 carbon atoms to render oil more readily and completely removable from fibers by washing in aqueous solution. No. 2,093,863. Richard G. Clarkson and Samuel Lenher to du Pont, all of Wilmington, Del.

Soap builder for improving water softening, sudsing, and detergent properties of water-soluble soap, suitable for use in any proportion needed for cleansing requirements, and for water of various degrees of hardness without increasing alkalinity of soap product beyond a predetermined low point; comprising mixture of tetra-alkali-metal pyrophosphate and a compound selected from the group of acids and acid reacting salts. No. 2,093,927. Walter C. Preston to Procter & Gamble Co., both of Cincinnati, O.

Liquid soap preparation, clear at ordinary temperatures, comprising hard water containing in solution a water-soluble soap and a water-soluble substance to prevent precipitation of hardness constituents of water by soap at ordinary temperatures, said substance consisting of a water-soluble pyrophosphate. No. 2,093,928. Walter C. Preston, Cincinnati, and Herbert S. Coith and Robert A. Duncan, Wyoming, Ohio, to Procter & Gamble Co., Cincinnati, O.

Ingredient for dry seed disinfectants: acetoxy polymercurated toluene. No. 2,094,085. Frederick Lawrence Sharp, Blackley, Manchester, England, to Imperial Chemical Industries, Ltd., corp. of Great Britain.

Production colored roofing. No. 2,094,150. Jeremiah D. Giles, New York City.

Process for controlling tackiness of a rubber-ester gum adhesive composition, incorporating mixture of ethyl and butyl acetates. No. 2,094,220. Ira D. Slomon, Hollis, N. Y.

Varnish base comprising Chinawood oil and alcohol-soluble phenol-interacted coumarone resin of low acid number, resin inhibiting gas-checking during drying of a varnish film comprising said base. No. 2,094,331. Joseph Rivkin, Pittsburgh, Pa., to Neville Co., corp. of Pa.

Herbicidal composition comprising sodium chlorate and sodium acetate. No. 2 094,366. Irving E. Melhus, Ames, Iowa, to Chipman Chemical Co., Inc., Middlesex, N. J.

Patents digested include issues of the "Patent Gazette," September 14 through October 5 inclusive.

Production hydroxy-sulfonic acids, assistants for textile and related industries; acting on an olefine, containing at least 8 carbon atoms and one double linkage at end of chain, with a strong liquid sulfonating agent. No. 2,094,451. Fritz Guenther, Ludwigshafen-am-Rhine, and Hans Haussmann, Mannheim, Germany, to I. G., Frankfort-am-Main, Germany.

Production wetting-out, washing, cleansing, lathering, and dispersing agents. No. 2,094,489. Richard Hueter, Hans Waldfrieden, Rosslau/Anhalt, Germany, to "Unichem" Chemikalien Handels A.-G., Zurich, Switzerland.

Anti-freeze liquid which also prevents corrosion; solution of furfuryl alcohol and water. No. 2,094,564. Otto Schenck, Dessau, and Walter Gellendien, to Deutsche Hydrierwerke Aktiengesellschaft, both of Berlin-Charlottenburg, Germany.

Acid-resistant, metal-adherent, soap-free grease, comprising a mineral lubricating oil, a hydrocarbon resin, and an oil-insoluble, very finely divided, fibrous, body-giving filler such as asbestos. No. 2,094,576. Maurice H. Arveson, Highland, Ind., to Standard Oil Co., Chicago, Ill.

Production colored tobacco smoke; through use of a volatile organic dye. No. 2,094,614. Otto Louis Miller, Memphis, Tenn., to Robert D. Abbott, St. Louis, Mo.

Composition of matter, comprising granulated cork and a binder composed of a mixture of artificial resins in solution in a plasticizer, producing article adapted for use as a sealing material, having such tensile strength and resiliency that under sealing pressures there is no tendency for cracking or disintegration. No. 2,094,627. Andrew Weisenburg to Crown Cork & Seal Co., Inc., both of Balto., Md.

Box toe for shoes having absorptive base impregnated with composition including a resinous material of higher melting point than rosin. No. 2,094,709. Clarence E. Kinney to Hercules Powder Co., both of Wilmington, Del.

Flexible, moistureproof sheet of transparent cellulosic material, selected from group of glassine paper and regenerated cellulose coated with a transparent chlorinated rubber film containing a compound having hydrocarbon nucleus of abietic acid. No. 2,094,717. Arloe R. Olsen to Hercules Powder Co., both of Wilmington, Del.

Manufacture wear-resisting anti-skid chips without use of heat for incorporation in floor surfaces, etc.; first preparing cold plastic of Portland cement, water, and a metal oxide. No. 2,094,727. Oliver Stella, Chicago, Ill.

Production hydroxy azo compounds, useful as insecticides; containing at least one hydroxy and one nitro group. No. 2,094,831. Donald L. Vivian and Herbert L. J. Haller, Washington, D. C., to free use of Public in territory of the U. S. A.

Chip-Proof Finish

A quick-dry, chip-proof, air-dry synthetic finish called "Hippo Oil," now being offered by the Hildreth Varnish Co., 87 N. 12th St., Brooklyn, N. Y., is claimed to have the following characteristics: One coat equals two coats of any lacquer; covers 500 to 800 sq. ft. per gallon; has extreme resistance to water, solvents, acids, alcohol and oil; can be reduced with petroleum solvent, a special "Hippo" solvent, or with toluol or xylol.

Luminescent Paint

"Dialux" is a new luminescent paint, the principal element of which is sulfur of calcium, a phosphorescent salt which acts as an accumulator of light. Like every accumulator, after 12 hours the sulfur of calcium can be considered as discharged, but on being reexposed to light for a few seconds (20 to 30) it will recharge. Paint is permanent and does not contain any radio-active matter; is not inflammable, nor toxic. It can be applied on everything and everywhere, on metal, glass, cloth, paper, wood, hard rubber compositions. Its chief value consists in indicating the position of objects in complete darkness. Manufacturer, the Grobet File Corp. of America, 3 Park Pl., New York City, states it can be used to advantage for many purposes.

POLKA DOT
366,095

WHITE STAR
379,154

AIRACOUSTIC
380,993

Onamelo
381,794

KEMIDOL
385,015

FORMOBLOCS
386,012

RUNEX

KICKS DIRT
387,474

SENTINEL
390,308

Bucko 25c Cleaner
390,777

DI-NA-MITE SPREDER
390,814

PROTECTION
391,091

Chets
391,171

RAMUC
391,181

PERFECTION PRODUCTS
391,587

CUT-MAX
392,278

EXPETRA
392,871

NOSUL
393,035

GRAPHOL
393,079

PORCOLUX
393,268

LIQUID SNOW
393,796

WEATHERITE
393,919

DIP-SAL
394,059

PAINT-O-SAL
394,062

GRO-LUX
394,081

AROMIS
394,109

Calannul
394,110

PAL-LO
394,247

SANDERMA
394,350

CHAMPLIN'S
FORMULA
NUMBER FIFTEEN

Harry Champlin
394,577

RUBNU
394,679

SA·GO
394,704

VISCOTE
394,815

Blue Top
394,870

366,095. Gordon-Allen, Ltd., Oakland, Calif.; June 12, '35; clothes washing soap; use since Mar. 15, '35.

379,154. R. R. Street & Co., Inc., Chicago; June 1, '36; superfatted dry cleaner; use since 1933.

380,993. Johns-Manville Corp., New York City; July 14, '36; felted mineral fibre sheets; use since June 8, '36.

381,794. Walgreen Co., Chicago, Ill.; Aug. 3, '36; ready mixed paints and enamels; use since July 24, '36.

385,015. U. S. Gypsum Co., Chicago, Ill.; Oct. 31, '36; dolomitic hydrated lime; use since Oct., '36.

386,012. Jean Coll, Hawthorne and New York City, N. Y.; Nov. 27, '36; chemical for use in shaping hats; use since July, '35.

387,474. Joe Perryman, Columbia, Ky.; Jan. 5, '37; soap powders; use since Dec. 8, '36.

390,308. Cliffs Dow Chemical Co., Marquette, Mich.; Mar. 20, '37; anti-freeze preparation; use since Oct. 6, '36.

390,777. Buck-O Cleaner Co., Marshalltown, Iowa; Apr. 1, '37; cleaner for white shoes, belts, etc.; use since Mar., '36.

390,814. Sherwin-Williams Co., Cleveland, O.; Apr. 1, '37; insecticides, fungicides, and flocculators; use since Feb. 10, '37.

391,091. Rust Proofing Co. of Canada, Ltd., Montreal, Que., Canada; Apr. 8, '37; metal cleaning compositions which provide rust and corrosion resisting coatings; use since Mar. 11, '37.

391,171. Theo. J. Bowes (Bowes Products Co.), Passaic, N. J.; Apr. 10, '37; cleaning preparation, having disinfectant, insecticidal and germicidal properties; use since June, '36.

† Trade-marks reproduced and described cover those appearing in the *U. S. Patent Gazettes*, middle week Sept. 14 through Oct. 5, inclusive.

391,181. Inertol Co., Inc., New York City; Apr. 10, '37; paint enamels, paints, varnishes, fillers, thinners, lacquers, etc.; use since May 6, '35.

391,587. Perfection Paint & Color Co., Indianapolis, Ind.; Apr. 20, '37; paints and paint products, including polishing wax; use since Mar. 15, '37.

392,278. E. F. Houghton & Co., Phila., Pa.; May 4, '37; chlorinated hydrocarbon base for cutting oils; use since Apr. 9, '37.

392,871. Cornelis Knoppe (Handels-Onderneming "Intermarina"), Rotterdam, Netherlands; May 17, 37; lubricating oils, greases, kerosene, and gasoline; use since Dec. 19, '36.

393,035. E. F. Houghton & Co., Phila., Pa.; May 20, '37; chlorinated hydrocarbon base for cutting oils; use since Dec. 1, '36.

393,079. Philip A. Hunt Co., Brooklyn, N. Y.; May 21, '37; photographic developers; use since May 1, '37.

393,268. H. Ehrlich & Sons Mfg. Co., St. Joseph, Mo.; May 26, '37; paint or enamel finish having appearance of porcelain for metal, wood, etc.; use since June 1, '35.

393,796. Isidor Chernin, New York City; June 8, '37; insecticide; use since Apr. 15, '27.

393,919. Clarence R. Rex, Toledo, O.; June 10, '37; specially prepared, treated, and compounded mortar, stucco, artificial stone, etc.; use since Dec. 3, '36.

394,059. Dr. Salsbury's Labs., Charles City, Iowa; June 14, '37; poultry and animal dip, disinfectant and deodorant for farm buildings; use since Mar. 11, '36.

394,062. Dr. Salsbury's Labs., Charles City, Iowa; June 14, '37; light modifying window paint for poultry houses and brooders; use since Apr. 1, '35.

394,081. Gro-Lux, Inc., St. Paul, Minn.; June 15, '37; fertilizers, particularly a soluble nitrate known as urea colored by a soluble and tinted dye effective only when mass has been moistened; use since May 10, '33.

394,109. Calgon, Inc., Pittsburgh, Pa.; June 15, '37; water softening and conditioning chemical for industrial and domestic purposes; use since May 13, '37.

394,110. Calgon, Inc., Pittsburgh, Pa.; June 15, '37; water softening and conditioning chemical for industrial, laundry, and semi-industrial use; use since May 28, '37.

394,247. Pal Products Co., Inc., Brooklyn, N. Y.; June 18, '37; porcelain, tile, and enamel cleaning preparation; use since Dec. 15, '34.

394,350. Robinson Bros. & Co., Inc., Portland, Me., and Malden, Mass.; June 21, '37; soap; use since Jan. 25, '02.

394,577. Harry Champlin, Beverly Hills, Calif.; June 28, '37; photographic film developer; use since Dec. 20, '36.

394,679. Salvatore Rizzuto (Rubnu Co.), Brooklyn, N. Y.; June 29, '37; polishing, preserving, and waterproofing preparation for leather articles, also rubber and rubber treated goods; use since Feb. 1, '37.

394,704. Samuel C. Goldman, Norfolk, Va.; June 30, '37; emulsified wax and thinner for sewing thread used in shoe stitching machines; use since June 22, '37.

394,815. Valvoline Oil Co., Cincinnati, O., and New York City; July 2, '37; lubricating oils and greases; use since Sept. 14, '34.

394,870. Stanley Paint & Varnish Co., Inc., Brooklyn and New York City; July 3, '37; drain pipe cleaner; use since Dec. 7, '34.

Columbus Varnish, 260 Cozzens st., Columbus, O., is adding two adjoining buildings, increasing the floor space by 15,000 sq. ft.

JIFFY
Blue Top
394,872

POLYZIME
394,875

RED CLOUD
PETROLEUM PRODUCTS
394,923

PORTHOS
394,939

CASEKAL
394,964

INSTANTO
395,077

BEAVER
395,081

Midway
395,139

Multicide
395,199

POLYMERIN
395,259

DWINAX
395,263

KYDO
395,450

BITULITE
395,464

BITUPLASTIC
395,465

PARATAC
395,492

PARANOX
395,493

395,494

RAYTINT
395,532

MOLE-NOTS
"THEIR LAST MEAL"
395,576

COTOPLAC
395,595

Eagloss
395,615

F-X
395,747

WALVET
395,814

POWDERED SILK
395,890

"KEMSODA"
395,967

PENTEX
395,972

TITAMINE
395,995

VANISH
396,030

PENNITRATO
396,067

Cal-Test
396,223

SEAL-BOND
396,376

Powdered Silk
396,542

PAKA
396,572

394,872. Stanley Paint & Varnish Co., Inc., Brooklyn and New York City; July 3, '37; wall paper remover; use since Dec. 7, '34.

394,875. Takamine Lab., Inc., Clifton, N. J.; July 3, '37; textile desizing agent; use since Mar. 15, '15.

394,923. James S. Warren (Red Cloud Refining Co.), Crawford, Nebr.; July 6, '37; gasoline, kerosene, fuel oils, lubricating oils and greases; use since Feb., '34.

394,939. General Chemical Co., New York City; July 7, '37; sodium phosphate, particularly trisodium; use since Dec. 16, '36.

394,964. Muralo Co., Inc., New Brighton, N. Y.; July 7, '37; calcimine or decorative wall coating powder; use since Nov. 14, '36.

395,077. National Lead Co., New York City; July 10, '37; ready mixed paints, pigmented enamels, and lacquers; use since Feb. 20, '05.

395,081. Pacific Distillers, Inc., Culver City, Calif.; July 10, '37; anti-freeze solution; use since June 10, '37.

395,139. Midway Chemical Co., Chicago, Ill.; July 12, '37; stove polish, shoe cleaner, and polish and cleaners for various household and personal purposes; use since May 12, '30.

395,199. McLaughlin Gormley King Co., Minneapolis, Minn.; July 14, '37; insecticides; use since June 29, '37.

395,259. Ault & Wiborg Corp.; Cincinnati, O., and New York City; July 16, '37; ready mixed paints, varnishes, and paint ename's; use since June 18, '37.

395,263. Baldwin Labs., Inc., Saegertown, Pa.; July 16, '37; wax preparation for linoleums, asphalt, rubber, mastic composition, wood floors, etc.; use since June 1, '37.

395,450. Kydo Mothproofing Corp.; Boston, Mass.; July 20, '37; mothproofing compounds; use since May 25, '37.

395,464. Wailes-Dove-Hermiston Corp.; New York City; July 20, '37; light reflecting paint for walls, ceilings, etc.; use since July 12, '37.

395,465. Wailes-Dove-Hermiston Corp., New York City; July 20, '37; plastic bituminous composition for waterproofing purposes and for use as flooring, roofing, and insulation; use since July 12, '37.

395,492. Standard Oil Development Co., Linden, N. J.; July 21, '37; lubricating oils; use since Jan. 27, '37.

395,493. Standard Oil Development Co., Linden, N. J.; July 21, '37; lubricating oils; use since Sept. 21, '36.

395,494. Standard Oil Development Co., Linden, N. J.; July 21, '37; chemical compounds for use in lubricating oils to reduce their cold tests and viscosity indices, and improve and increase various other properties; use since Mar. 16, '33.

395,532. Krebs Pigment & Color Corp., Wilmington, Del.; July 22, '37; paint pigments; use since May 11, '37.

395,576. Robert H. Harkins (Nott Mfg. Co.), New York City; July 23, '37; insecticide for moles, rats, mice, and gophers; use since Apr., '33.

395,595. Samson Plaster Board Co., Buffalo, N. Y.; July 23, '37; asphalt roof cement and coating, asbestos fiber coating; use since Oct., '35 on asbestos fiber coating, and since May, '36, on asphalt roof cement and coating.

395,615. General Printing Ink Corp., Cleveland, O.; July 24, '37; printing ink; use since Apr. 9, '37.

395,747. Cane Chemical Co., Inc., New York City; July 29, '37; liquid dog shampoo which kills fleas, etc.; use since June 24, '37.

395,814. Cleveland Cleaner & Paste Co., Cleveland, O.; July 30, '37; wall paper cleaner; use since June 1, '37.

395,890. Aadkens, Inc., Des Moines, Iowa; Aug. 2, '37; scouring and cleaning powders and soap; use since July 26, '37.

395,967. Robertson Chemical Corp., Norfolk, Va.; Aug. 3, '37; fertilizer; use since May 18, '28.

395,972. U. S. Rubber Products, Inc., New York City; Aug. 3, '37; chemical compound used as accelerator and vulcanizer of rubber; use since Apr. 19, '37.

395,995. R. P. Kalsomine Co., Inc., San Francisco, Calif.; Aug. 4, '37; calcimine water paints; use since July 24, '37.

396,030. Expello Corp., Dover, N. H.; Aug. 5, '37; toilet bowl cleaner; use since July 23, '37.

396,067. El Roy Naval Stores, Inc., Vidalia, Ga.; Aug. 6, '37; wood preservative and insecticide; use since July 1, '35.

396,223. Calgon, Inc., Pittsburgh, Pa.; Aug. 10, '37; chemical compound having water softening and germicidal properties; use since Aug. 3, '37.

396,376. Vita Var Corp., Newark, N. J.; Aug. 13, '37; paints, paint enamels, varnishes, and synthetic spar vehicle; use since July 6, '37.

396,542. Raymond J. Meyers (Powdered Silk Mfg. Co.), Boone, Iowa; Aug. 18, '37; cleaning preparation for removing all kinds of dirt from hands, bathtubs, porcelain, etc.; use since Jan. 1, '27.

396,572. George C. F. List, Phila., Pa.; Aug. 19, '37; soap chips; use since July 15, '36.

Lefkowitz Goes to London

S. Howard Lefkowitz, Neva-Wet Corp. president, sailed for London where he will announce at a cocktail party that a fiber identification laboratory will be opened there similar to the one now in operation in this country.

CHEMICAL

NEWS & MARKETS

Distinguished foreign visitor, Dr. Heinrich Koppers, who is visiting this country for the first time since the war

EXPOSITION TO OPEN DECEMBER 6th

Over 300 Companies to Exhibit Latest Chemicals and Equipment—Diehl Wins Slogan Contest With "Chemical Research Creates Industries"—"New Chemicals of Commerce" to be Shown Again—

The night is hot, almost unbearably so, the room is blue with smoke. Young men sit about a table dictating answers to such questions as—"Where can supplies of phenol be bought?" or "Who makes picric acid?" or "What companies can build driers, filter presses, autoclaves, etc., of such and such dimensions and capacities?" The time—23 years ago. The place—The Chemists' Club in New York. The men—the "Grosvenor Boys," young members of the club acting as volunteer librarians. The World War was but a few months old, but already American manufacturers were desperately struggling against tremendous difficulties to plug the gap caused by the complete cessation of supplies of vital chemicals normally imported. No one thought of a slogan for the group, but one did have a germ of an idea—an exposition, a clearing house of information as to where this type of equipment or that particular chemical might be obtained; a meeting place where the industry could exchange information, learn and see new developments in chemicals and the equipment to make them.

Charles F. Roth thought so well of his idea that he immediately started to make it a reality and on September 20, 1915, the first Exposition was held. On Dec. 6th, Mr. Roth, slightly heavier and a little greyer, will throw open the doors for the 16th in the series of Expositions of Chemical Industries.

The latest will contrast strongly with the first in many respects. Exhibitors will number over 300 compared with the small handful in 1915. But attendance will be much smaller, for the first was somewhat of a "three-ring circus" to a public suddenly aroused to the supreme necessity of a strong and varied chemical industry as a matter of national defense, whereas at the 16th Exposition, as has been the practice now for many years, visitors will be restricted to those more directly concerned with the industry and not motivated principally by mere curiosity.

Choose a Suitable Slogan

The Expositions of Chemical Industries, held every two years, serve a definite purpose, but have lacked until now a slogan—"a brief descriptive expression encompassing the aims and the benefits redounding to men from the activities of the Chemical Industry." This deficiency has been corrected by a Du Pont assistant division purchasing agent, Norman E. Diehl, winner in a contest sponsored by the Exposition management and judged by the Exposition Advisory Committee with Dr. M. C. Whitaker as chairman.

"Chemical Research Creates Industries" is the winning slogan. It keynotes and typifies the spirt of the 16th Exposition which will act as a visual report on the progress made by the chemical and allied fields in the past two years of business recovery.

Three entire floors have been reserved, and advance indications are that all previous records for number and variety of products may be surpassed. Attendance is likely to exceed the total of 38,707 who saw the previous one.

Display of New Chemicals

"The New Chemicals of Commerce"—chemicals developed by advertisers in CHEMICAL INDUSTRIES and the CHEMICAL BUYERS' GUIDEBOOK in the past two-year period (since the last exposition) will be displayed at Booth 28 on the main floor. This display, shown at the past three expositions, has attracted a great deal of attention in the past and was commented on most favorably, for it gathers together in one place actual samples of the latest advances in chemical manufacturing and supplies chemists, engineers, consultants, and consumers with their physical and chemical properties, uses, etc. In addition, the December issue of CHEMICAL INDUSTRIES will contain the entire list, arranged alphabetically. Present indications are that some 250 such products will be on display at the CHEMICAL INDUSTRIES' booth and the editors extend a cordial welcome to all visitors to view the exhibit.

Space does not permit a listing of the chemicals and equipment that will be shown for the first time. Mr. Roth, exposition manager, when interviewed, reported that he dare not disclose in advance any of the new outstanding developments that have been disclosed to him. But for those who are interested in problems of materials, handling equipment, chemicals, plant equipment, laboratory equipment and supplies, instruments for recording and control, containers and packaging equipment, metals and alloys, and electrical equipment, the Exposition offers a splendid opportunity to seek information and advice and to see actual samples and representative units of equipment, many in operation.

Since the World War this business generation has seen more industrial chemical progress than their fathers and grandfathers witnessed in the half century back to our Civil War. Almost every tiny square inch of the vast chemical field has been turned over by the sharp plough of progress.

Take fertilizers as a sample—twenty years ago the American industry had no synthetic nitrogen, no domestic potash, no superphosphate higher than 16%. Ammonia liquor treatment had been thought of but was untried and flotation was undreamed of by the phosphate producers. "Trace elements" had been suspected only. Urea, ammonia nitrate, indeed all the high-test, soluble nitrogen carriers were truly "chemical curiosities."

And the same is true in practically every branch of all the chemical industries. New processes and new products, new competition and new customers—what do they mean today?—and tomorrow?

To explain technical fertilizer developments so simply that a cub salesman can understand them and to analyze their dollars and cents effects upon all branches of the chemical industry so clearly that the youngest laboratory helper can "get the business point of view," there are few men who are so well qualified as Charles H. MacDowell, retired head of the Armour Fertilizer Works—twice president of the National Fertilizer Association, an honorary D.Sc. for his contributions to fertilizer technique, an economic adviser to the Peace Commission in Paris, 1919; a successful executive who has long been a careful student of agronomy, economics, and history.

"Fertilizers: 1918-1938" by Charles H. MacDowell will be published in an early issue.

Thirty similar articles by thirty as well qualified authorities will be published in CHEMICAL INDUSTRIES during the coming twelve months.

A Few of the High Spots

Tantalum will be the subject of an educational exhibit depicting the mining, ores, intermediates, metallurgy, and fabricated products of that metal. Specialized applications of lead and its alloys in manufacturing operations will be shown.

Interesting process equipment on display will include a magnetic separator for removing iron and other magnetic particles from suspension in liquids; a complete glass-lined steel distillation assembly including still, condenser, and receiver. Also, a 1,000 gal. glass-lined reaction kettle. Several booths will be given over to equipment for dust collection, and in one of these the operating model of a precipitator, glass-enclosed for demonstration, will show spectators the method by which an electrical discharge instantly precipitates a deposit of smoke and clears the atmosphere.

For those interested in the fabrication of chemical plant equipment there will be an exhibit to demonstrate the weldability of stainless steels. At another booth an operating model, in miniature, of a mechanical thickener developed for removing 70,000 tons of silt a day from 8 billion gals. of turbid Arizona river water, will be on display.

The practical use of titanium and zirconium in the chemical fields is relatively new, but one exhibit will be devoted to showing some recent applications. Featured will be the metals themselves, their salts, oxides and silicates.

These are but a few of the products and equipment that will be shown and are simply cited as examples of what visitors at the 16th Exposition of Chemical Industries may view on display. The advances in chemical manufacturing technique even in the past two years have been astonishing, but even more so are the products which have come out of the laboratories of the country and are now in commercial production.

Attendance at the coming Exposition is expected to be greater due to the meeting of the American Society of Mechanical Engineers scheduled for the same week in N. Y. City. Matters of design, purchase, and operation of industrial plant equipment, the function of chemical and mechanical engineering, are constantly becoming increasingly related and most of the mechanical engineers in the city for their convention are expected to view the show at the Grand Central Palace.

The 16th Exposition of Chemical Industries will open Monday, Dec. 6th and close Saturday Dec. 11th at 6 p. m. Weekdays the Exposition will be open from noon until 10 p. m.

Actual presentation of the award of $250.00 to Mr. Diehl for his winning slogan will take place on Monday evening, Dec. 6th, at 8 p. m. At the same time 10 other prizes will be given to the runners-up in the contest.

Tone, Carborundum, is '38 Perkin Medalist

Lammot du Pont Attacks Higher Taxation—Douglas Goes to McGill—Smith, Carbide Consultant, Receives Miller Memorial Medal—Others in the News of the Month—

Frank J. Tone, president, Carborundum Co., and father of Franchot Tone, motion picture star, is the '38 Perkin Medalist of the Society of Chemical Industry for "valuable work in applied chemistry, including the development of abrasives and refractories." Dr. Tone, cited as "outstanding scientist, engineer, inventor and executive," originated the first commercial process for the production of silicon metal, regarded as a major achievement in metallurgical chemistry. Medal will be presented by Columbia's Marston Taylor Bogert on Jan. 7, 1938, at a joint meeting of the Society of Chemical Industry and the A.C.S. at the Chemists' Club, N. Y. City.

Born in Bergen, N. Y., in 1868, Dr. Tone was graduated from Cornell in '91. In '95 he became associated as works manager with Edward G. Acheson in the development of carborundum and artificial graphite and became president of the company in '19. He was awarded the first Jacob F. Schoellkopf Medal in '31; the Edward Goodrich Acheson Medal in '35.

COMING EVENTS

International Acetylene Association, Birmingham, Nov. 10-12.
American Institute of Chemical Engineers, St. Louis, Nov. 17-19.
A. C. S. Ohio-Michigan Regional Meeting, Columbus, Ohio, Nov. 19-20.
American Association of Textile Chemists & Colorists, annual meeting, Bellevue-Stratford Hotel, Philadelphia, Dec. 3-4.
National Asphalt Conference, Memphis, Tenn., week beginning Dec. 6.
National Association of Insecticide & Disinfectant Manufacturers, Semi-Annual Convention, Hotel Biltmore, N. Y. City, Dec. 6-7.
American Society of Mechanical Engineers, New York, Dec. 6-10.
Exposition of Chemical Industries, Grand Central Palace, N. Y. City, Dec. 6-11.
Second Annual Symposium, Division of Physical & Inorganic Chemistry, Cleveland, Dec. 27-29.
Seventh National Organic Chemistry Symposium, Division of Organic Chemistry, Richmond, Va., Dec. 28-30.
National Association of Dyers and Cleaners, Hotel Stevens, Chicago, Jan. 17-20, 1938.
Fifth International Heating & Ventilating Exposition, Grand Central Palace, New York City, Jan. 24-28, 1938.
The American Society of Refrigerating Engineers, 33rd Annual Meeting, Roosevelt, N. Y. City, Jan. 25-27, '38.
American Ceramic Society, 40th Annual Meeting, New Orleans, March 27-April 2, '38.
A. C. S., 95th Meeting, Dallas, Apr. 18-21, '38.
International Petroleum Exposition, Tulsa, Okla., May 14-21, '38.
10th International Congress of Chemistry, Rome, May 15-21, '38.

LOCAL TO NEW YORK*

Nov. 16th. The American Institute. "The Needs of American Society," Aldine Club.
Nov. 16th. Drug, Chemical and Allied Trades Section, N. Y. Board of Trade. 47th Annual Meeting, Pennsylvania, 6:30 P. M.
Nov. 16th. Oil Trades Association of N. Y. Place unannounced.
Nov. 19th. Societe de Chimie Industrielle, Columbia University.
Dec. 10th. Joint Meeting A. C. S. and Society of Chemical Industry.
Jan. 10th. Perkin Medal Award.

* Chemists' Club, unless otherwise noted.

"Cost is the common denominator of our economic system," Lammot du Pont told an audience at the Franklin Institute, Philadelphia, on Oct. 13, and warned that the basic policy of the chemical industry consistently to lower the price of goods and services is now face to face with the obstacles of continued advances in taxation and a growing cost of doing business.

Mr. du Pont pointed out the record of the chemical industry—despite an increase of 68% in all wholesale prices since 1899, chemical prices have gone up only about 4%. Employment today is 27% higher than in '29, although in manufacturing generally it is still about 5% lower than the '29 peak. The chemical industry's average hourly wage, also the average weekly wage, is 15% higher than that for all manufacturing.

In the final analysis, pointed out Mr. du Pont, wealth comprises goods and dollars are worth only what they will buy. "Place goods within the means of more people to buy and at once you distribute wealth, add value to your money. Rising wage scales mean nothing if prices rise with them, but maintain fair wages and reduce prices and you actually raise wages."

Dr. C. M. A. Stine, du Pont vice-president, was also on the program and reported that the U. S. last year used 5 times as much synthetic fiber as it did natural silk. Rayon, he added, is breaking down class distinctions.

Talks were in connection with the premiere showing of the exhibit, "Better Things for Better Living, through Chemistry."

Douglas Returns to Teaching Profession

Dr. Lewis Williams Douglas, former Director of the U. S. budget, and a Cyanamid vice-president since his break with President Roosevelt over monetary policies, will become principal and vice chancellor of McGill University on Jan. 1st. Mr. Douglas will retain his American citizenship.

Mr. Douglas, as a young member of Congress from Arizona, as a protagonist of President Roosevelt in the '32 campaign and as director of the Federal budget in '33 and '34, fought valiantly for governmental economy. When the economy bill he helped draft was scuttled, and the President rejected the policy of a balanced budget, he declined to go along and resigned in September, '34.

Mr. Douglas' grandfather was a member of the Board of Governors of McGill 20 years ago, and also served for a time as chancellor of Queens University at Kingston, Ont. His grandfather founded

the town of Douglas, Ariz., where Lewis Douglas was born July 2, 1894. While teaching at the Hackley School in Tarrytown, N. Y., after the war, Mr. Douglas met and married Margaret Zinsser, daughter of Frederick Zinsser, president of Zinsser & Co.

For the Advancement of the Welding Art

H. Sidney Smith, Carbide consultant, received the Samuel Wylie Miller Memorial Medal in recognition of "meritorious achievement contributing conspicuously to the advancement of the art of welding and cutting," at the annual meeting of the American Welding Society at Atlantic City on Oct. 17.

Marshall Receives Schoellkopf Medal

James G. Marshall, superintendent of Carbide's Niagara Falls plant, received the Jacob F. Schoellkopf Medal (awarded by the Western N. Y. Section of the A.C.S.), at Niagara Falls, on Oct. 19. Award was made last spring but Mr. Marshall was abroad and presentation could not be made as customary at the Society's May meeting. Dr. J. S. Fonda, du Pont Rayon, made the presentation, and Vice-President J. H. Critchett, Carbide and Carbon Research Laboratories, Inc., spoke on "The Work and Character of James G. Marshall."

For Better Safety

The Chemical Section of the National Safety Council will have as general chairman, H. L. Miner, du Pont; vice-chairman in charge of programs, Ralph L. Rogers, Jr., Tennessee Eastman Corp.; vice-chairman (engineering), Ralph O. Keefer, Aluminum Co. of America; secretary, R. S. Mackie, General Electric, Nela Park, Cleveland; News Letter Editor, F. W. Dennis, Hooker Electrochemical; membership committee chairman, C. E. Sevrens, Merrimac Chemical; visual education committee chairman, E. L. Root, Celluloid Corp.; statistics committee chairman, R. C. Stratton, The Travelers Insurance Co., Hartford. Members at large include: A. L. Armstrong, Eastman Kodak; E. F. King, Lever Brothers; S. D. Kirkpatrick, *"Chem. & Met."*; John Roach, Deputy Commissioner of Labor, Trenton, N. J.; John S. Shaw, Hercules Powder; Plumer Wheeler, American Cyanamid; and S. E. Whiting, Liberty Mutual Insurance.

At the Chemical Section meeting it was revealed that chemical injuries dropped 32% in frequency rate in '36. Twenty of the 75 chemical companies in the first chemical section safety contest sponsored by the National Safety Council finished the first half of '37 without a single disabling accident. Certificates were presented to the winners in the 3 general divisions.

Deaths of the Month

Lord Rutherford, 66, director and guiding genius of the world famous Cavendish Laboratory, Cambridge University, died Oct. 18. He received the '08 Nobel Prize in Chemistry for his outstanding contributions in the then almost unknown field of atomic physics. He admittedly ranks as one of the greatest chemists and physicists of all time.

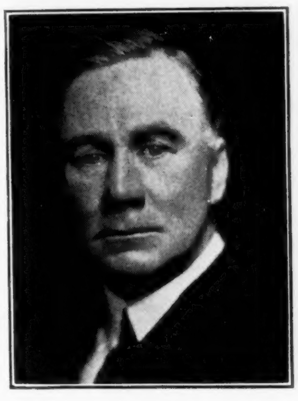
Gogarty Dies After Year's Illness

Bernard J. Gogarty, 42, of the sales staff of Commercial Solvents, died Oct. 13, following an illness of more than a year. Born in Brooklyn on April 11, 1895, he received his education in the public schools of that city and Jersey City. After a period with Cudahy Packing he became associated with J. L. Hopkins, botanical drugs, N. Y. City. In '24 he joined S. B. Penick, but two years later returned as sales manager for Hopkins. His next connection was with Rossville Commercial Alcohol and when that organization was taken over by Commercial Solvents he became a member of the latter's sales staff. Mr. Gogarty took a prominent part in the association work of the industry. He was president of the Salesmen's Association in '34 and chairman of the entertainment committee for the '35 and '36 dinners of the Drug and Chemical Section of the N. Y. Board of Trade.

Dr. Wilfrid Greif

News of the death of Dr. Wilfrid Greif in Germany has been received. When he retired in '35 because of ill-health Dr. Greif was first vice-president and a director of the American I.G. He was 54.

As we go to press, we learn of the untimely and unexpected death on November 7th of Francis P. Garvan, head of the Chemical Foundation and also



leader in the Farm Chemurgic Council movement. He was stricken with pneumonia on November 4th. A full account of the contributions made by Mr. Garvan to the advancement of American chemical industry will appear in our December issue.

Names in the News

Foster Dee Snell, Brooklyn consultant, addressed the St. Louis and Kansas City Sections of the A.C.S. on Oct. 4 and 5 respectively; subject—"Some Factors in Detergency." Slogan "Chemical Research Creates Industries" brought first prize of $250.00 to Norman E. Diehl, assistant division purchasing agent of du Pont. Award was made by the Chemical Exposition Advisory Committee headed by Dr. M. C. Whitaker. Presentation will be made at the Exposition, Grand Central Palace, N. Y. City, Monday evening, Dec. 6.

Williams Haynes, publisher of CHEMICAL INDUSTRIES, spoke at regular monthly dinner meeting of the Chemical Club of Philadelphia, Oct. 21, answering the hypothetical question: "Well, Mr. Chemist, What Now?" In supplying the answer to this query, Mr. Haynes traced the profound influence that chemistry has exerted upon the social and economic structure, down to our present modern civilization. The "Booster Prize" for attendance was presented by President Lyman S. Lloyd and was won by John F. Belsterling, Aschenbach & Miller.

Dr. Thomas H. Norton, one of the most beloved men in the chemical industry, graduate of Hamilton in 1873, and still active member of the technical staff of American Cyanamid, will receive the Lavoisier Medal of the Societe Chimique de France from the French Consul, General Comte de Ferry de Fontnouvelle at a meeting of the American Section of the Societe at Havemeyer Hall, Columbia University, Friday, Nov. 19, at 8.15 P. M. Both chemical executives and chemists of the war period and immediately after are familiar with the contributions made by Dr. Norton to the advancement of the American chemical industry.

Dr. Ernest B. Benger, du Pont's chemical department, spoke on "Change" before the 26th annual meeting of the American Association of Port Authorities at the Hotel du Pont, Wilmington, on Oct. 12th.

A. B. Cowdery, Barrett's expert on rubber compounding, is convalescing at St. Luke's Hospital, New Bedford, Mass., following a severe automobile accident.

Dr. Colin G. Fink will address the Lynn, Mass., Section of the American Institute of Electrical Engineers on "Research in Electrochemistry" on Nov. 16th.

Dr. John H. Northrop, of the laboratories of the Rockefeller Institute for Medical Research, Princeton, N. J., received the Chandler Medal on Oct. 27th.

Dr. Paul D. Merica, director of research, International Nickel, is awarded the '38 John Fritz Gold Medal, highest of American engineering honors, for "important contributions to the development of alloys for industrial uses."

Heavy Chemicals

Industrial Chemical Shipments Decline Sharply

Slump in Metals Causes Readjustment in Several Salts—Acetate of Lime Reduced 15c—Anhydrous Ammonia Schedule First To Be Released—No Change in Texas Sulfur Tax—Nichols New Prior V.-P.—

Important Price Changes

ADVANCED	Oct. 30	Sept. 30
Salt Cake (imp.)	$15.00	$12.00
DECLINED		
Acid acetic 28%	$2.38	$2.45
Calcium acetate	1.95	2.10
Antimony	.17¼	.17⅜
Copper carbonate 50%	.16½	.17½
Copper metal	11.75	13.00
Copper sulfate	4.75	5.00
Lead acetate	.12	.13½
Sodium stannate	.32	.36
Tin metal	.48⅜	.56¼
Tin crystals	.37	.41
Tin oxide	.54	.60
Tin tetrachloride	.24½	.28

Heavy Chemical Briefs

Cliftona Print & Dye Wks., Clifton, N. J., is ordered liquidated. . . Mid Continent Chemical is new Chicago chemical distributor, 6805 N. Clark st. . . Inyo Chemical, formerly engaged in extracting Trona in Inyo County, California, files bankruptcy petition in Federal Court, Los Angeles. . . Great Western Electro-Chemical purchases 10 acres at Martinez, Calif., for future expansion. . . Hope for selling Wagaraw Road plant of United Piece Dye at Hawthorne, N. J., is gone; company plans to liquidate, selling machinery and real estate. . . Air Reduction takes over plant and business of Crystal Carbonic, Charlotte, N. C. . . Peter Ross, formerly president, Clyde Piece Dye and Lido Piece Dye, is president of newly organized Guaranty Piece Dye, 17 First ave., Paterson, N. J.; this is plant vacated by Paragon Dye.

Nichols Goes with Prior

Thomas S. Nichols resigns as assistant manager of the Metropolitan N. Y. branch office of the Grasselli Chemicals Department of du Pont to become a vice-president of Prior Chemical. He assumes his new post on Nov. 15th and fills the vacancy created by the resignation of George S. Cooper who recently became vice-president in charge of sales for Diamond Alkali at Pittsburgh.

Mr. Nichols after attending the University of Pennsylvania joined the du Pont organization at the Newark, N. J., pigment plant; was transferred in '28 to the Philadelphia sales division. A year later he came to the N. Y. division at the time du Pont took over the Grasselli Chemical Co. Mr. Nichols was guest of honor at a dinner on Oct. 28th given by a number of du Pont salesmen and executives.

Prior Chemical was formed in '22 with Harold Prior as president, and his brother, Herbert, as vice-president. Company handles a variety of industrial chemicals, and is sole selling agent for Standard Chromate division of Diamond Alkali.

The downward trend in general industrial business activity was reflected in the volume of shipments of industrial chemicals. Consumers momentarily are limiting purchasing and withdrawals against contracts to immediate manufacturing requirements. A year ago the opposite was true, purchasing agents were frantically building up inventories against the fear of sensationally rising prices.

Manufacturing costs are rising, chiefly because of higher wages, and despite the current recession in manufacturing and the decline in raw commodity prices many chemicals are likely to be higher in '38. Where higher prices are indicated for the coming year an increase in the rate of withdrawals against existing contracts over the balance of '37 will more than likely take place; where existing schedules are renewed no incentive will exist for building up inventories.

Most of the price changes in October were caused by the slump in the metals. Tin, zinc, lead, and copper reached new lows for '37. Copper declined from 13c to 12c late in the month and just before the close a quotation of 11¾c was announced by certain suppliers. Copper sulfate, as a result, was lowered to $4.75 per 100 lbs., although stocks are at the lowest point in years and shipments, particularly exports, have been exceptionally heavy. The price of tin has been admittedly high and the fall in value to 48c has been severe. From London come reports that a great deal of "bear" selling has been indulged in. If and when a definite change in sentiment induces consumers to cover their forward requirements and "bears" to cover their sales a sharp upward reaction is probable. Meanwhile, tin salts are at the year's lowest point. At the close of October crystals were quoted at 37c; sodium stannate at 32c; tin tetrachloride at 24½c.

The decline in acetate of lime late in September from $2.25 to $2.10 was followed early in October by an additional loss of 15c per 100 lbs., with the result that 28% acetic in carlots was lowered 7c to a $2.38 basis. The keen competitive position between the wood distillers and the synthetic producers naturally becomes more accentuated when demand falls off.

A 1c decline in 50-52% copper carbonate to a 16½c level, a 1c loss in black copper oxide to a 17c basis were based on a 13c copper market. Further weakness appeared possible with the red metal selling at 11¾c. Lead acetate broke 1½c to 12c.

Decline in Alkali Shipments

Incoming business in alkali has slackened significantly in recent months in keeping with general industrial activity, but volume in the remaining months promises to parallel that of the comparable period of '36. Soda ash sales in '37 are expected to be about 15% larger than in '36; the gain for caustic will likely be somewhat under this figure.

'38 Anhydrous Ammonia Prices

First important contract price announcement for '38 is on anhydrous ammonia. In general it follows out current levels and the usual differential of 1½c is noted for consumers contracting before the termination of the contracting season Dec. 15th.

No Change in Sulfur Tax Rate in Texas

The special session of the Texas Legislature has closed with the sulfur severance tax rate of $1.03 per ton unchanged. Various measures were introduced, the highest calling for a $1.50 rate. By the time the proposed increase reached the Senate it was down to $1.10, but the session closed without action.

Sulfuric Production Steady

While acute scarcity of spot stocks of sulfuric has been corrected somewhat, manufacturers have very little available aside from their contract customers' requirements. As a result, firmness characterizes the market. Production of acid by 58 fertilizer manufacturers totaled 179,008 tons in August, receipts to 72,122 tons, consumption by reporting manufacturers to 168,015, shipments to 91,556 tons, and stocks at the end of the month to 67,167. Production in July amounted to 166,927 tons, consumption to 141,935, stocks at the end of the month to 75,608. A comparison of figures for the 8-months' period is given:

	Jan.-Aug. 1937	Jan.-Aug. 1936
Production	1,406,403	1,082,409
Consumpt., mfr. fert.	1,276,237	823,710

Sulfur Exports Rise

August exports of sulfur, both crude and refined, were valued at $1,358,000 against $1,006,400 for the same month last year—in quantity shipments of crude increased from 52,624 to 73,734 tons and refined from 1,075,000 to 2,636,000 lbs.

Alkali Prices Announced

Contract prices for 1938 were announced on November 8th for several important commodities.

Soda ash will be on a basis of 90c per 100 lbs. in bulk carloads; $1.05 in paper bags; $1.08 in burlap bags, and $1.35 in bbls. These prices are works prices. No change in carload prices for caustic, but l.c.l. prices of both soda ash and caustic will be 10c per 100 lbs. higher.

Chlorine in tank cars remains unchanged; prices for sulfuric, muriatic, nitric and battery acids are unchanged.

Coal-Tar Chemicals

Important Price Changes		
ADVANCED	Oct. 30	Sept. 30
None		
DECLINED		
None		

Carriers Get Half a Loaf

The Interstate Commerce Commission's granting of a $47,500,000 rate boost on Oct. 22 has failed to satisfy the carriers and on Oct. 29 The Association of American Railroads began an intensive campaign to win I.C.C. approval of proposed freight and passenger rate increase totaling $508,000,000. J. J. Pelley, president of the association, explaining that railroad operating expenses have increased $663,303,000 annually since '33, states, "this action has been forced upon the railroads because the margin between income and operating expenses has been squeezed so thin that they face a real crisis."

Soft coal, coke, lignite, iron, steel, iron ore, building materials, and petroleum bore the brunt of the increase granted Oct. 22. Indications are that the carriers will seek a 15% horizontal freight rate increase, basing their plea that the current rise granted fails to offset the losses incurred when the emergency rates were removed, the higher costs of supplies, and the wage increases which they have been forced to grant.

The I.C.C. stopped on Oct. 29 the attempt of carriers to place in effect on short notice freight rate schedules providing $25,000,000 of rate increases on commodities withdrawn from the major rate case decided earlier in the month. Commission held they must abide by the statutory requirements of 30 days, during which the schedules are subject to suspension and protest.

No Immediate Rise in Trucking Rates

Despite freight increases to the railroads, the trucking industry will probably move warily toward upward revision of its rate structure, according to Arthur G. McKeever, managing director of the Merchant Truckmen's Bureau and a member of the national classification and rates committee of the American Trucking Association. Latter association will hold its annual meeting at Louisville, Nov. 12. Possibilities are that should the railroads win additional rate increases that trucking interests will then seek to boost their own structure.*

* A petition for a blanket and country-wide 15% freight rate will be asked of the I.C.C. by the truckers, it was disclosed at meeting of Mid Atlantic Motor Conference on Nov. 4th.

Good Export Demand for Coal-Tar Chemicals

Routine Demand for Dyes—Coke Production Declines—China Trade in Dyestuffs Demoralized—Elko Chemical New Paradichlorbenzene Producer—Better Outlook for Consumption of Coal-Tar Solvents—

The decline in domestic demand for coal-tar chemicals is offset partially, at least, by a steady volume moving through export channels, particularly benzol, toluol, phenol, and certain intermediates. Prices for the important items in the group remained firm and unchanged. The swift slide downward in steel operations with consequent lowering of coking has prevented any noticeable surpluses of crudes.

Some improvement has occurred in the demand for toluol, xylol, and solvent naphtha by producers of finishes for the automotive field, yet purchasing has been largely of a hand-to-mouth variety. Manufacturers are momentarily waiting until they receive some indication as to the response to the new models which officially went on display at the N.Y. show in the final week of October. They were enthusiastically received and, according to producers, sales were heavy, indicating that a 5,000,000 car year, the best since '29, is still probable. Early estimates of October automotive production are about 360,000 units, exclusive of Ford's production.

Sale of dyestuffs was largely routine in the past month. Vat colors are receiving some attention, but the uncertain state in textiles, leather, paper, and other consuming fields is operating against any noticeable seasonal improvement.

Very little talk of '38 prices is heard in the trade to date. Neither producers nor consumers are particularly anxious to make commitments at the moment and it is likely that quotations for the coming year will not appear until late in November.

August Exports Total $1,324,000

Due mainly to heavier shipments of intermediates, dyes, stains, colors, and the like, exports of coal-tar chemicals increased in value in August, totaling $1,324,000, as compared with $988,500 in the corresponding month of '36. In this group intermediates increased in quantity from 165,390 to 848,000 lbs.

Coking Operations Slip in September

A moderate slowing down of blast furnace operations in September was responsible for a curtailment of the upward trend of coke production, which for two months had shown an advance over the preceding month. It is expected that this trend was further accentuated in October when steel operations declined to approximately 55%. September production of byproduct coke totaled 4,426,375 tons, as compared with 4,571,062 in August and 3,836,800 in September, '36. Benzol totaled 10,765,000 gals., as compared with 11,144,000 gals. in August and 9,140,000 in September last year. Ammonium sulfate amounted to 68,990 tons, as compared with 71,399 for August and but 59,694 tons in September of '36.

Figures for the August-January period are given below:

Production:	1937	1936
Byproduct coke, tons	39,114,971	32,083,100
Benzol, gals.	93,592,000	75,348,000
Ammonium sulfate, tons	620,660	500,111

Light oil recovery in September was 18,187,875 gals., against 18,890,966 in August and 15,807,887 in September a year ago. Total for the 9 months was 162,998,802 gals., as compared with 122,565,738 in the corresponding period of last year. Tar production for the first 9 months was 495,973,674 gals., as against 403,588,948 for the similar period of '36.

Sino-Jap Crisis Affects Dye Sales

Military operations in China have almost completely demoralized its important trade in imported dyestuffs and if continued for any extended time may result in reviving its natural vegetable indigo dye industry. In recent years China's textile mills have made increasingly greater use of coal-tar dyes as the purchasing power of its masses increased. The U. S. has had an important share of this business.

Steel Industry as a Chemical Producer

Gas, tar, oils and chemicals valued at more than $133,000,000 were produced by the steel industry in '36 as byproducts of coke production, according to an estimate made by the American Iron and Steel Institute. The byproducts were produced during the manufacture of more than 33,400,000 tons of coke in the 9,600 byproduct ovens operated by the steel industry.

A minor explosion occurred at Neville's plant near Pittsburgh on Oct. 13th. A spectacular $15,000 fire took the life of a Seattle fireman and destroyed the plant of the American Tar Co. on Oct. 1st.

Elko Chemical Announced

The Elko Chemical Co., Newark, N. J., is a new producer of paradichlorbenzene, orthodichlorbenzene, monochlorbenzene, and muriatic acid. Lee A. Kolker, formerly with Mathieson Alkali, is president. Philipp Brothers, N. Y. City, will handle the sale of Elko products.

Explosion at Nitro

Two deaths and $30,000 damage were caused at Monsanto's Nitro, W. Va., plant on Oct. 2nd by an explosion. One unit of the plant was completely wrecked.

Competition Drives Vanillin Prices Down

Quicksilver Levels Off at $85—Acetylsalicylic Again Advanced 5c—Refined Glycerin Reduced 2c—Natural Camphor Slightly Higher—Good Demand for Certain Seasonal Items—

Fine Chemicals

Several important price changes were announced in October in fine chemicals. The long-awaited competition from the so-called wood vanillin finally came to the surface and quotations were reduced sharply to $3.00 for guaiacol vanillin and $3.10 for vanillin ex eugenol, a decline in both instances of 55c.

Quicksilver was down to $85 per flask at the close of the month. The heavy purchasing abroad for war purposes appears to have quieted down. With domestic buying extremely light, the price structure has weakened considerably. Current stocks appear ample for present requirements. Mercurials remain unchanged and unless further declines occur in the metal, no price revisions are expected in the salts. For the past few years the so-called normal spread between the metal and the salts has not existed, and producers of the latter maintain that even the present relationship is still considerably out of line. With domestic producers meeting the $85 quotation on mercury, a levelling off at this figure is anticipated at the moment at least. But, of course, the mercury market is well-known for its sudden and totally unexpected changes.

Producers of acetylsalicylic acid announced a further advance of 5c, bringing the current quotation up to 60c. This is the second rise in a short period, a 5c increase having been made on Sept. 13th. A greatly increased demand is reported by leading manufacturers, but part of the increase can also be traced to the higher level of phenol.

Other price changes of the month included a $3 reduction in santonin caused by local competition and despite the rather uncertain state of supplies from abroad. Agar moved higher, a 5c increase being noted for No. 1. The replacement market in this item has been very strong for some time. A 1c advance took place in natural camphor. Many are wondering why products of Japanese origin have not moved much higher, but so far the Sino-Japanese crisis has only seriously affected raw materials from Chinese sources. Naturally, freight rates have increased from Japan and space is rather difficult to get at times, but unless the situation in the Far East becomes more involved, with other countries entering the conflict, there is little likelihood of a famine in items coming out of Japan. She is most anxious to maintain trade balances and will strive to the utmost to keep her exports moving.

Seasonal improvement is reported in codeine, morphine, citrated caffeine, menthol, cod liver oil, sodium salicylate, certain of the bromides, quinine salts, and terpin hydrate. Severe competition in sulfanilamide continues and quotations are now down to $1.25. Accumulation of stocks is blamed for a 4c reduction in cocoa butter with the carlot price now 14½c. Firm prices continue to feature bismuth metal and its salts. A decline in the call for citric was seasonal, but despite keen competition, no further price reductions occurred. Firm raw material prices continue to give strength to the tartars although some decrease in demand has taken place. Production of ephedrine compounds is at a standstill due to the almost complete lack of supplies of the raw material.

Fair Demand for Aromatics

A moderate demand featured the markets for aromatic chemicals sufficiently large, however, to support the current price structure. A fair number of inquiries were noted for methyl salicylate, musk, benzaldehyde, benzyl alcohol, and linalyl acetate. Good volume was reported in coumarin.

Surprise Reduction in Refined Glycerin

Somewhat unexpected was the 2c reduction in the refined grades of glycerin but a disappointing demand and rising stocks forced the issue. A month or two ago the general impression in the market was that a steady and unchanged price structure would continue through the balance of the year. The carlot price for c. p. is now 19½c and the l.c.l. quotation 20c. What makes the present reduction still more striking is that it occurs just as the anti-freeze season is opening up. However, this market is now not so attractive to glycerin producers as it formerly was. Their interest centers more in other fields where they lost out on important tonnages during the period of abnormally high prices and scarcity of stocks earlier this year.

Synthetic Jap Camphor

Japanese Government grants permit to Nanaya Yamaguchi to erect synthetic camphor plant to produce from 24,000 to 25,000 metric tons annually at Masudamachi, Minogori in Shimane Prefecture.

Neuberg in Larger Quarters

William Neuberg, Inc., importer and specialist in tartars, is taking additional quarters at its present address, 441 Lexington ave., N. Y. City.

Important Price Changes

ADVANCED	Oct. 30	Sept. 30
Acid acetylsalicylic	$0.60	$0.55
DECLINED		
Cocoa butter	$0.14½	$0.18½
Mercury	85.00	89.00
Santonin	22.00	24.00
Sulfanilamide	1.25	1.80
Vanillin ex eugenol	3.10	3.65
Guaiacol	3.00	3.55

Abbott's New Stock Issue

Abbott Laboratories, North Chicago, called a special meeting of stockholders Nov. 4 to vote on the creation of 50,000 shares of cumulative convertible preferred stock, $100 par. It is planned to offer initially at par 20,000 shares of the new issue with a dividend rate of 4½%, callable at 107 and convertible one share into two shares of common.

Personal Notes

Francis J. McDonough, N. Y. Q. president, returning in the *Queen Mary* on Oct. 4 after an extended European trip, reports less war talk in Europe than here. . . Percy C. Magnus, president of the N. Y. Board of Trade, president, Magnus, Mabee & Reynard, is chairman of the commerce section of the N. Y. City United Hospital Campaign. . . George W. Simons, Heyden vice-president, heads up the drug and chemical division of the drive for funds. . . Joseph A. Huisking, president, Drug and Chemical Club, chairman, Drug, Chemical and Allied Trades Section of the N. Y. Board of Trade, and secretary, Charles L. Huisking, Inc., completes a quarter of a century in the drug, chemical and allied lines. . . Burton T. Bush, sales manager of Naugatuck's aromatics division since its establishment, has resigned, according to General Sales Manager, John P. Coe.

Heesch Joins Heyden

Herbert Heesch, for the past 4 years in the fine chemicals sales department of Hooker Electrochemical, joins the sales division of Heyden Chemical. Mr. Heesch, graduate of Rochester University, majored in chemical engineering.

Schering's New Plant

Schering Corp., Bloomfield, N. J., is negotiating purchase of 21-acre plot in Union, N. J., on which to erect a plant. Details were revealed when rezoning was requested.

Heyden's annual outing for employees was held at Bear Mountain, N. Y., on Oct. 2.

Solvents and Plasticizers

Important Price Changes

ADVANCED

	Oct. 30	Sept. 30
None		

DECLINED

	Oct. 30	Sept. 30
Cleaners' naphthas grp. 3	$0.06⅞	$0.07⅜
Glycerin C.P.	.19½	.21½
Lacquer diluents	.07⅞	.08⅜
Petroleum thinners	.05⅞	.06⅜
Rubber solvents	.06⅞	.07⅜
Stoddard solvent	.06⅜	.06⅞
V. M. & P. Naphthas	.06⅞	.07⅜

New White Oil Plant

Pennsylvania Refining, Butler, Pa., completes new plant for the manufacture by a new process of all grades of white medicinal oils, Russian type mineral oils, and all grades of technical oils. Plant is built in uni-style—additional units can be added without disturbing manufacturing operations.

Appoints St. Louis Agent

Kessler Chemical division of American Distilling appoints Harry G. Knapp, Railway Exchange Bldg., St. Louis, as representative in that territory. Local warehouse stocks will be maintained in St. Louis.

McGovern Re-Engaged

The Industrial Alcohol Institute re-engages for '38 the services of James P. McGovern as general counsel.

In New Locations

A. J. Rimberg Co., N. Y. City exporter and importer of chemicals and raw materials, is now in larger quarters at 117 Liberty st. . . Industrial Distributors, Inc., and its sales division, The Maintenance Supply Co., are in new quarters at 174 E. 105th st., N. Y. City.

To Enlarge Charlotte Plant

Cyanamid will expand its Charlotte plant, according to H. L. Derby, president of Cyanamid & Chemical. Accompanying Mr. Derby on his recent southern trip were:—Arthur J. Campbell, general sales manager; J. D. Lowery, A. Scharwachter, and George E. Taylor, department sales managers; Dr. N. A. Shepard from the Stamford laboratory; C. L. O. Graul, director of manufacturing; A. Klipstein, advertising manager; G. W. Patterson, credit manager; H. W. Rose, head of textile finishing materials; Henry Zeni, head of imported starches and flours; and W. F. Whitescarver. Charles H. Stone headed the Charlotte office group attending the conferences.

Midcontinent Petroleum Solvent Prices Soften

Not All Producers Join in Decline—Tankwagon and Eastern Seaboard Prices Unchanged—Rubber Consumption Disappointing—Increased Consumption of Anti-Freeze Expected by Producers—September Denatured Alcohol Production Up Sharply—Methanol Production Heavy—

Unsettlement in the midcontinent price structure for petroleum solvents occurred late in the month. Some refiners reduced quotations while others adhered to the schedules in force. These reductions marked the first price changes in many months. Prices at eastern seaboard refineries were firm and unaltered. Tankwagon quotations were unchanged. The weakness in the midcontinent area was forecast by a severe decline in gasoline prices. Movement of solvents into the coatings field was spotty last month. While the automobile producers are rapidly getting back into quantity production they are doing so on a fairly conservative basis, preferring to test out their markets because of the break in the stock and commodity markets and the general decline in business activity.

Consumption of industrial alcohol holds up well. Pure ethyl from grain was a bit weak as a result of the action of the grain market but that from molasses was firm. The sudden and unexpected loss of 2c in the refined grades of glycerin is reported on in greater length in the fine chemicals section. The market for crude was unchanged.

A pick-up in shipments of acetone, butyl acetate, butyl alcohol, and ethyl acetate was caused directly by the stepping up by automotive producers of production to a rate of 100,000 units a week. Tire producers in the Akron area are still operating on a 2 or 3 day schedule with the result that shipments of solvents so far are quite disappointing. Huge inventories still plague the tire manufacturers.

Manufacturers of solvents, plasticizers, compounding materials, etc., naturally are interested in estimates of rubber consumption by American manufacturers over the balance of the year. Many in the trade now doubt that the total for the last 3 months of the year will be above 135,000 tons. A few weeks earlier the trade expected 150,000 tons which would bring the total consumption for the year to about 590,000 tons, as against 573,000 tons last year. September crude rubber consumption, 43,893 tons, was slightly higher than August but fell below the 46,449 tons consumed in September a year ago and was disappointing to the trade. To date rubber consumption in '37 is only 3.8% ahead of the corresponding period of last year.

It Depends Upon the Weather

Producers of anti-freeze anticipate a much better year than last and base their optimism on the fact that the number of cars now in use greatly exceeds those in service a year ago. Also, the wish is the father to the thought—but they can't see how another extremely mild winter can follow the last. The chief uncertainty is fear that new car sales, because of the current recession, may not equal last year's. But the figures of the American Petroleum Institute are reassuring for they anticipate a 2,000,000 registration increase will be made for the year '37.

Denatured Alcohol Statistics

September production of completely denatured alcohol totaled 4,805,340 wine gals., as compared with 2,144,764 in September a year ago. Total from July 1, '37 to Sept. 30th amounts to 7,645,498 gals., as compared with 3,365,932 in the corresponding period last year. August removal was 4,649,040 gals., as compared with 2,068,815 for September '36. Removal for the period July 1st to Sept. 30th amounted to 7,355,558 gals, as compared with 3,406,922 in the same period of '36. Stocks on hand at the end of Sept. 30th totaled 1,136,359 gals., and were 2,202,802 gals. on Sept. 30, 1936.

Similar figures in wine gallons for specially denatured are as follows:—

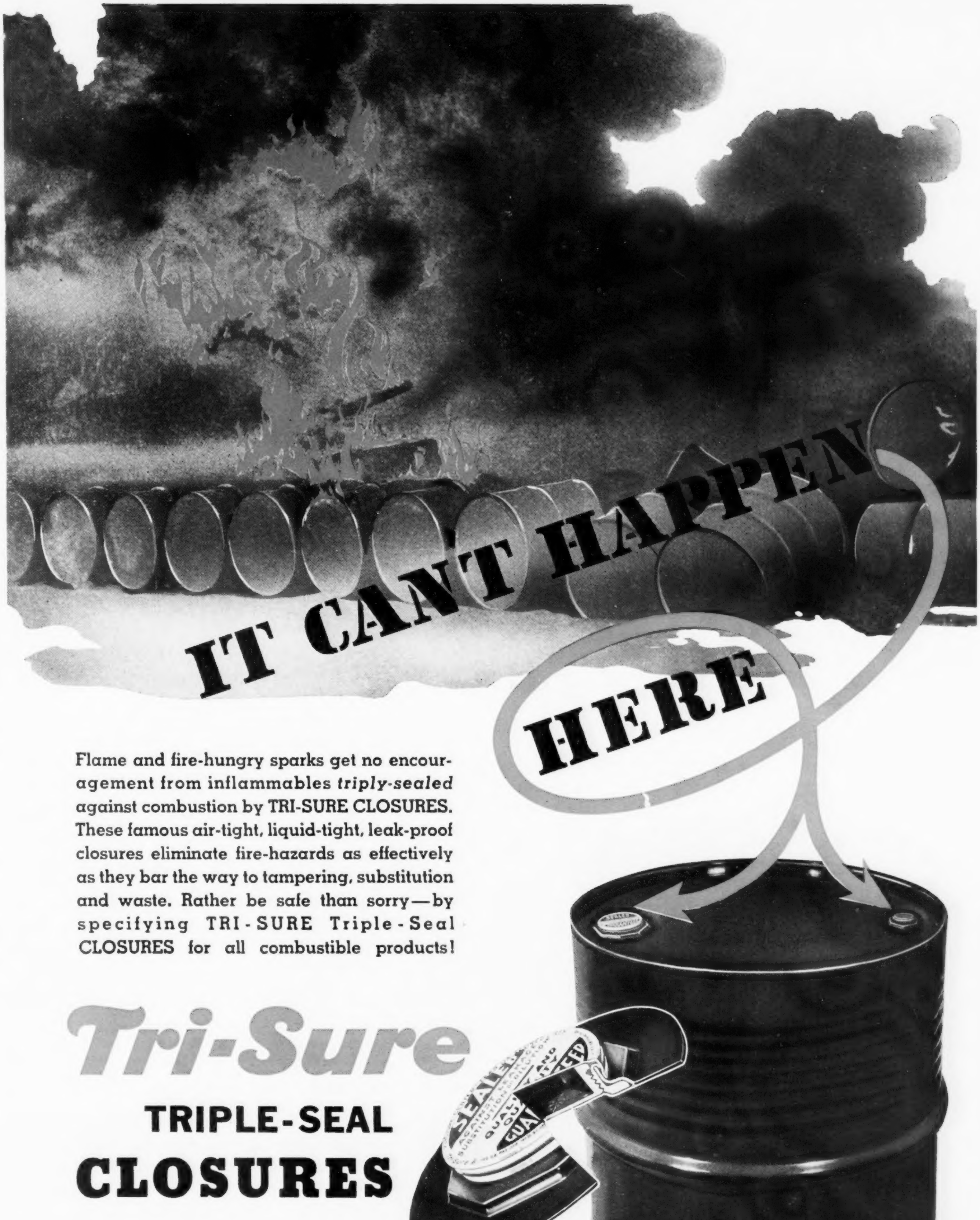
	Sept. 1937	Sept. 1936	July-Sept. 1937	July-Sept. 1936
Produced ..	6,705,983	6,487,318	18,550,781	18,341,557
Removed ..	6,656,577	6,436,152	18,558,387	18,228,776
Stocks	778,597	553,268	....	....

Methanol Production Rises

September methanol production amounted to 404,112 gals. of crude and 3,018,333 gals. of synthetic. This compares with 429,500 and 2,695,591 respectively for September of '36 and 462,584 and 2,735,963 in August of the current year. September synthetic production was the largest for any month so far this year and is largely due to anticipation of anti-freeze sales. September, October, and November production usually runs heavy.

Restricts Phenol Plastics

Phenol plastics use is now restricted in Germany. Tightened official control over processing of phenolic plastic materials is caused by prevailing shortage of the requisite raw material and desire to guide consumption to replace imported materials, such as non-ferrous metals, hardwoods, leather, and adhesives.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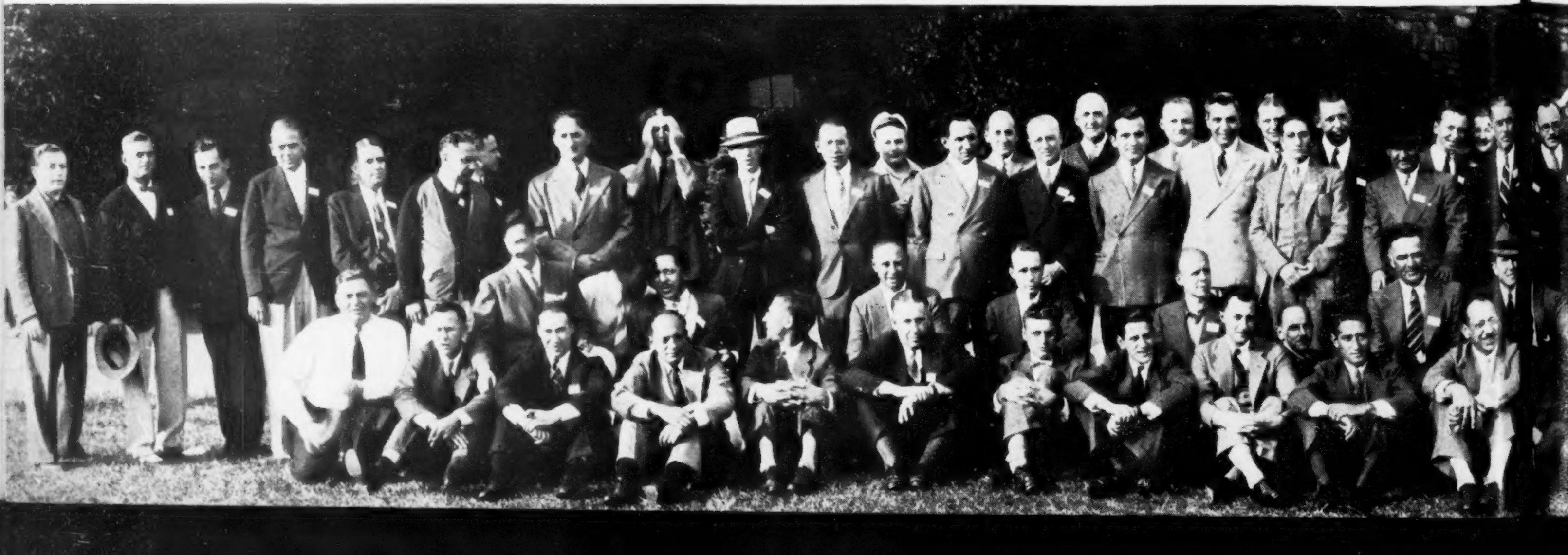
CHEMICAL

The Photographic Record

William M. Rand, president, Merrimac Chemical, receiving from Grover G. Kingsley, vice-president, Liberty Mutual Insurance Co., certificate of merit awarded in recognition of outstanding safety record of Merrimac employees in working without a lost-time-accident for 756,449 man hours. In left foreground is Osborne Bezanson, Merrimac vice-president (in soft hat), and at his left, Earl Sevrens, safety engineer.

The third annual Sales Meeting of the Western Districts of American Cyanamid, recently held in Chicago, was attended by H. Leigh Derby, Jr., C. T. Cornell, J. C. Morrison, P. E. Holder, R. L. Moore, W. H. Leon, W. D. Kavanaugh, O. J. DeLon, E. F. Heizer, R. M. Drake, T. G. Baldwin, H. H. Suddard, K. Heilemann, K. Coate, of the Chicago District; C. Byron, H. T. Coghill, O. M. Cornell, C. M. McGovern, W. B. Lambert, A. H. Carpenter, of the Cleveland District; W. H. Andrews, C. R. Crandell, of the St. Louis District; W. S. Taylor, L. R. Verdon, J. R. Verdon, E. B. Taylor, J. R. Lyon, of the Kalamazoo District; Dr. A. O. Jaeger, C. R. Caryl, of the Bridgeville Plant; R. A. Asbury, of the Joliet Plant; G. B. Horsfull, G. Johnston, E. H. Tussell, E. F. Keating, of the Detroit District; Dr. N. A. Shepard, of the Stamford Laboratories; A. J. Campbell, L. M. Rice, J. M. Sanderson, R. M. Banks, E. A. Wieland, A. Scharwachter, H. W. Rose, J. D. Lowery, G. E. Taylor, G. W. Patterson, J. M. Walsh, A. Klipstein, of the New York Office.



NEWS REEL

of Our Chemical Activities

M. L. Blanc, president, Acticarbone Corp., going on board the Queen Mary, as he sailed for Europe recently. Prize photograph of the month, submitted by E. L. Luaces.

A sailing we will go! Above, William M. Rand (Merrimac) gives a practical demonstration of the hangman's noose on Louis Neuberg (Westvaco). Right, George F. Handel (Cincinnati Chemical) watching for squalls; and below, Howard Mansfield (Grasselli-duPont) counting the catch of tarpon, marlins, sharks and whales.

Fred L. Brooke, famous Chicago paint materials factor, who has just taken on the sales representation of the Kessler line of solvents.

Below and opposite, 140 members of the New York Paint Production Club who were guests of D. H. Litter at a party given by D. H. Litter Co. and their principals. The party cruised the Hudson to Bear Mountain where they participated in a variety of sports and amusements, concluding with a dinner at the Bear Mountain Inn.

No Improvement in Raw Fertilizer Markets

Mixers Confused On '38 Outlook—Sulfate Advances—Ammoniates Break Further—September Tag Sales Under Total for Same Month of '36—Haskell Joins Barrett—Insecticide Prices Revised—Coope New President, Potash Co. of America—

No improvement can be reported in the markets for raw fertilizer materials in October. The stagnation in trading continues unabated. Mixers are still too confused as to the prospects for '38 to make sizable commitments. The provisions of the farm control program are still vague and the drop in farm commodity prices has seriously curtailed the expected farm income. The unexpected size of the cotton crop with its consequent increase in available cottonseed meal, the possibility of higher domestic and ocean freight rates, the proposed wage and hours bill are additional factors which the raw material suppliers and the mixers are concerned with and as yet have no definite idea as to what final influence they will have on the price structure. Most or all of these problems will be publicly and privately discussed at the Atlanta meeting of the National Fertilizer Association opening on Nov. 9th.

The $27.50 price on the 6 months minimum contracts for ammonium sulfate and the $28.50 per ton spot price, both for October delivery, expired at the end of the month. The contract prices for 6 to 8 months are $28 for November-December delivery and $28.50 for January-June delivery; 1 to 5 months contracts are $1 per ton additional. Potash suppliers report that little tonnage was influenced by the expiration on September 30 of the 5% discount on salts (ordered with specifications for delivery in approximately equal quantities from Oct. 1st to Jan. 31st) for most consumers had previously placed their requirements during the period when even larger discounts were available. Prices for the past month have been at full list.

Higher ocean freight rates appear a certainty and the increases are expected to go into effect as of the first of the year. Accordingly, suppliers of European fertilizer materials are selling with the proviso that any increase in rates is for the account of the buyer. European potashes are not included, however. Jap sardine meal is not being offered for shipment as far ahead as Jan. 1st but a 10% increase in freight rates is expected to go into effect at the turn of the year.

Ammoniates Work Lower

Despite several months continued weakness organic ammoniates broke badly again. Much of this loss is attributed to the 17,573,000 bales forecast for cotton, a total only topped by the '26 crop. Mixers are interested in the quantity of meal that will be available and consequently are cold to current offerings of blood, nitrogenous material, tankage, pomace, fish scrap, etc.

September tag sales were somewhat under last year but with that exception were by far the largest for any September since the depression period. Aggregate sales in 17 reporting states totaled 225,975 tons as against 257,869 in September a year ago, a decline of 12%. In the first 9 months tag sales totaled 5,392,463 tons, as compared with 4,345,223 in the corresponding period of '36, an increase of 24%, and were the largest for the period since '30. A substantial decline in Florida sales in September accounted for the decline in the South's total for that month. Florida tonnage in September last year was abnormally high. A 25% rise over last year was reported by the 12 Southern states for the January-September period. Total September sales in the South amounted to 135,018 tons, as against 145,822 for last year; total September sales in 5 Mid-West States totaled 90,957 tons as against 112,047 in '36. A sharp sales drop was noted in Indiana and an increase in Kansas.

Superphosphate Production Heavier

September superphosphate production was again substantially higher than in the corresponding period of last year, but the increase over '36 was somewhat less than that of earlier months. September output, 306,149 tons, was 17% larger than the 260,672 tons turned out in September a year ago. The January-September output of 2,779,266 tons exceeds the 1,933,497 tons of the corresponding period of last year by 44%. Production of plants in the Southern area in September was slightly under last year, following the very sharp increases earlier in the year.

Total shipments in September of 385,943 tons was slightly under the 386,921 tons of the same month a year ago. A moderate decline in stocks took place, a change which is normal. At the close of the month stocks of bulk superphosphate were 27% larger than a year ago (919,365 against 723,283) and the largest for the month since '31.

Coope Heads Potash Co. of America

G. F. Coope, executive vice-president Potash Co. of America, succeeds Col. Robert Marsh, Jr., as president. Col. Marsh is returning to such private consulting work as the state of his health will permit. He reports that, after many years in South America, the climate here did not agree with him. Mr. Coope was very active in the nitrate industry previous to his present connection.

Agricultural Chemicals

Haskell, New Barrett V.-P.

Sidney B. Haskell resigns as president Synthetic Nitrogen Products to become a Barrett vice-president in charge of the company's ammonia department. After research work abroad and a period of teaching he became director of the soil improvement committee of the National Fertilizer Association in '16. Four years later he joined the Massachusetts Experimental Station as director. In '27 he became vice-president of Synthetic Nitrogen Products and director of the company's agricultural department and a year and a half later was elected president of the company. He is considered one of the country's outstanding agronomists as well as one of the most astute fertilizer executives.

Personalities in the News

John J. Watson, I.A.C. president, is on the Southern Railway directorate. . . I. D. Dawes, V.-C. comptroller, presided at a group meeting of the Controllers Institute of America, held in N. Y. City early in October. . . Horace Corey, Cyanamid, leaves shortly for another Central American trip. . . L. H. Carter, A.A.C. president, sailed Oct. 2nd in the *Georgic* for an extended tour through Europe. . . Frederick W. Crouse and Albert Averill are awarded the W. H. Bowker scholarships at the College of Agriculture, University of Maine. . . Members of the entertainment committee for the N.F.A. Atlanta convention are:—H. B. Baylor, I.A.C. vice-president; J. E. Barnes, Atlanta manager for Royster Guano; and J. E. Nunnally, manager V.-C.'s Atlanta sales office.

New Insecticide, Fungicide Prices

Considerable interest centered on the markets for agricultural insecticides and fungicides late last month when price advances were reported for bordeaux mixture, lead arsenate, and Paris green, and the schedule for calcium arsenate was continued. Bordeaux is now quoted at 11½c for l.c.l. quantities and 11c in carlots; lead arsenate in territory east of and including the states of Montana, Wyoming, Colorado, Oklahoma and Texas is quoted at 13½c for dealers in l.c.l. lots and 13c for carloads. The new price on Paris green for the entire U. S. in 100-lb. and 250-lb. drums is 25½c in carloads. For smaller quantities a 1c differential has been established.

Jones & Laughlin Steel, Pittsburgh, will build a sulfate warehouse and bagging plant at Memphis.

Fats and Oils

Resale Tung Oil Available at Lower Prices

Futures Still Nominal—Cottonseed Oil Sharply Lower on News of Record Crop—Increased Production of Domestic Edible Vegetable Oils Reported—Record 6-months' Consumption of Drying Oils—

Important Price Changes

	Oct. 30	Sept. 30
ADVANCED		
Corn, crude	$0.07	$0.06¾
DECLINED		
Chinawood, spot	$0.18	$0.23
Coconut, crude	.04¼	.04⅝
Cottonseed, crude	.05⅞	.06
Olive oil foots	.10¼	.10¾

Salesmen Honor Gogarty

Principal business at the annual meeting of the Salesmen's Association of the American Chemical Industry, at the Chemists' Club, Oct. 26, was the selection of a nominating committee: Bill Barry, Mallinckrodt, chairman; Vandewater of Greeff; Farrell, *Drug & Cosmetic Industry*; Furman, Merck; H. B. Prior, Prior Chemical; Weed, E. B. G.; Quinn, Mathieson.

President Lichtenberg spoke briefly of the loss sustained by the death of B. J. Gogarty, and a resolution was passed and forwarded to his family.

After a highly satisfactory report from "Joe" Wafer, Industrial Chemical Sales, on the state of the association's finances, Bart Sheehan, Grasselli Chemicals Department, du Pont, reported that the Christmas party will probably be held at the Hotel Pennsylvania and that a November luncheon will be held which a prominent speaker will address.

Wins "Chem. & Met." Award

Monsanto has won the '37 "Award for Chemical Engineering Achievement," instituted by *Chem. & Met.* for the successful design, construction and operation of the new phosphorus plant near Columbia, Tenn.

With Rosenthal Export Unit

G. E. Sternheim, formerly with a large chemical plant in Germany, joins the export and import division of the H. H. Rosenthal Co., N. Y. City.

Others in New Positions

Albert A. Woll, recent M.I.T. graduate, joins the technical staff of Wishnick-Tumpeer. . . Esmond W. Gifford, Union College, is now with Foster D. Snell, Inc. . . Dr. David E. Adelson, recently National Research Council Fellow at Columbia, is now on the research staff of Shell Development, Emeryville, Calif. . . Following have recently completed Ph.D. work at Columbia:—Russel B. Akin now with du Pont, Arlington, N. J.; Eugene W. Beste with Bakelite; Ben H. Perkins with Krebs at Newark, N. J.

Oils and fats generally followed the trend downward of commodity markets last month. The feature was the easier tone in chinawood, perilla and rapeseed. The appearance of resale offerings and a decided decline in demand were the explanations offered in trade circles. Futures in chinawood are strictly nominal, however, for the Far East situation became worse instead of better in the past 30 days. Two steamers with chinawood are reported to have left China late in October and this was a factor in the price structure. Oiticica declined in sympathy with the lower spot quotations on chinawood.

Cottonseed oil and lard futures cracked last month under the stress of the Government's estimate of a 17,500,000 bale crop. The trade generally looked for a 17,000,000 estimate which would have meant a yield of 4,000,000 barrels of oil. Details of the proposed purchase program to lift cottonseed prices through diversion of crude oil to shortening for relief distribution have been released. Program was prompted by the decline in prices for cottonseed to the lowest level since '15, with the exception of the depression years of '31-'33.

More Vegetable Oils—Less Lard

A sharp rise in production of domestic edible vegetable oils was recently reported by the Bureau of Agricultural Economics. Expected increases this year include a 33% gain in the supply of cottonseed oil, a rise of 15-20% in soybean, and smaller gains in peanut, corn, and other minor vegetable oils. Production of lard and other edible fats will probably be less in the '37-'38 period than in the preceding year, but it is believed that the increase in vegetable oils will more than offset this loss.

Outlook for Drying Oils

Consumption of fats and oils in paints, varnish, linoleum, oilcloth, and printing inks was estimated at 469,000,000 lbs. for the first 6 months of '37, compared with 395,000,000 in the same period of '36. Biggest increase—nearly 100,000,000 lbs.—was in consumption of linseed; consumption of perilla was sharply reduced. Bureau states, "competition of other drying oils with linseed has increased. . . the present business recession may weaken the demand for all drying oils in the next few months."

M., M. & R. Plans New Plant

Magnus, Mabee & Reynard, prominent N. Y. City dealer in essential oils, completes negotiations for the erection of a new building of ultra-modern design. Building to be constructed of translucent "glass-brick" facades, 6 stories high, will contain 60,000 sq. ft., and will provide N. Y. City with its first glass-brick industrial plant. Site is at 16 Desbrosses st. The old Fulton st. district, once the drug and chemical center of New York, will lose one of its oldest inhabitants when the oil firm occupies its new building.

STATEMENT OF THE OWNERSHIP, MANAGEMENT, CIRCULATION, ETC., REQUIRED BY THE ACT OF CONGRESS OF MARCH 3, 1933

Of *Chemical Industries*, published monthly at New Haven, Conn.

State of Connecticut, County of New Haven, ss.

Before me, a Notary Public in and for the State and county aforesaid, personally appeared Williams Haynes, who, having been duly sworn according to law, deposes and says that he is the Publisher of *Chemical Industries*, and that the following is, to the best of his knowledge and belief, a true statement of the ownership, management (and if a daily paper, the circulation), etc., of the aforesaid publication for the date shown in the above caption, required by the Act of August 24, 1912, embodied in section 411, Postal Laws and Regulations, printed on the reverse side of this form, to wit:

1. That the names and addresses of the publisher, editor, and business manager are: Publisher and Editor, Williams Haynes, 149 Temple St., New Haven, Conn.; Business Manager, William F. George, 25 Spruce St., New York, N. Y.

2. That the owner is: (If owned by a corporation, its name and address must be stated and also immediately thereunder the names and addresses of stockholders owning or holding one per cent. or more of total amount of stock. If not owned by a corporation, the names and addresses of the individual owners must be given. If owned by a firm, company, or other unincorporated concern, its name and address, as well as those of each individual member, must be given.) The Haynes & George Co., 149 Temple St., New Haven, Conn.; Williams Haynes, Stonington, Conn.; William F. George, Bayside, N. Y.

3. That the known bondholders, mortgagees, and other security holders owning or holding one per cent. or more of total number of bonds, mortgages, or other securities are: (If there are none, so state.) None.

4. That the two paragraphs next above, giving the names of the owners, stockholders, and security holders, if any, contain not only the list of stockholders and security holders as they appear upon the books of the company but also, in cases where the stockholder or security holder appears upon the books of the company as trustee or in any other fiduciary relation, the name of the person or corporation for whom such trustee is acting, is given; also that the said two paragraphs contain statements embracing affiant's full knowledge and belief as to the circumstances and conditions under which stockholders and security holders who do not appear upon the books of the company as trustees, hold stock and securities in a capacity other than that of a bona fide owner; and this affiant has no reason to believe that any other person, association, or corporation has any interest direct or indirect in the said stock, bonds, or other securities than as so stated by him.

5. That the average number of copies of each issue of this publication sold or distributed, through the mails or otherwise, to paid subscribers during the six months preceding the date shown above is ——. (This information is required from daily publications only.)

Williams Haynes, *Publisher.*

Sworn to and subscribed before me this 5th day of October, 1937. Anna L. Devlin, Notary Public. (Comm. expires February, 1942.)

Pigments and Fillers

Poor Demand for Raw Paint Materials

Lead Pigments and Leaded Zinc Oxides at Lower Levels—Casein Off ½c—September Paint Sales Below Same Month of '36—Construction Outlook Unfavorable—Paint Exports Hold Up Well—

Important Price Changes

ADVANCED

	Oct. 30	Sept. 30
None		

DECLINED

	Oct. 30	Sept. 30
Casein, 20-30	$0.12½	$0.13
80-100	.13	.13½
Lead, red 95%	.08	.09
97%	.08¼	.09¼
98%	.08½	.09½
Litharge	.07	.08
Orange mineral	.11	.12
Vermilion, quicksilver	1.65	1.75
Zinc oxide 35%	.06¼	.0645
50%	.063⁄8	.065⁄8

N. P. V. & L. A. Convention

The N. P. V. & L. A. concluded a highly successful 4-day convention at Cincinnati on Oct. 29th. Highlights were: approval by the executive committee and the trade sales session of a resolution vigorously opposing the granting of unearned discounts and recommending a free exchange of information in all markets by members of the trade sales division as a means of eliminating the granting of such unearned discounts; adoption of a resolution authorizing the continuation of the Council for Paint Styling as an association activity.

Dr. H. A. Gardner led the symposium on "Drying Oils for the Industry," Dr. William J. Hale spoke on "Raw Materials for the Paint Industry from the Farm," and Secretary Elton of the Association reported on the acute tung oil situation.

Strike at the plant of John Lucas & Co., Gibbsboro, N. J., ended Oct. 18th after 5 months and 5 days of idleness. Walter A. Gorrell, vice-president and general manager of the paint works, announced that many had urged a reopening of the plant including the governor of the state.

It is reported that A. M. Barney plans construction of a carbon black manufacturing plant in Arkansas to cost approximately $60,000. Headquarters have been established at Texarkana, Ark.

Wholesale Operating Costs

The Wholesale Division of the National Paint, Varnish & Lacquer Association, through the cooperation of Dun & Bradstreet, has just completed the 1937 Survey on Operating Costs for Paint and Varnish Wholesale Establishments. Survey was released at the annual meeting of the Wholesale Division, Oct. 26th, in Cincinnati. Walter Mitchell, Jr., of Dun & Bradstreet, addressed the meeting and led the discussion in explaining the Survey. Copies can be secured from the Association or Dun & Bradstreet, Inc., for 50c each.

Suppliers of raw paint materials report a disappointing seasonal demand and in certain quarters October was the dullest month for this year to date. This condition was further accentuated because of the annual meeting of the National Paint, Varnish & Lacquer Association at Cincinnati in the final week of the month. The slump in buying reflects the pronounced decline in the nation's construction program. While residential building for the first 8 months shows a gain of 32.7% and all construction one of 16.7%, a breakdown of the figures discloses that both gains are chiefly the result of unusual activity in the spring months and that since then totals have been declining. In addition, manufacturers of industrial finishes have been operating at greatly reduced schedules pending the change over in automobile models.

The tobogganing slide in lead and zinc prices last month forced lower quotations for lead pigments and certain grades of zinc oxide. White lead closed out the month at 7¼c, red lead at 8c, litharge at 7c, and orange mineral at 11c. The lead-free grades of zinc oxide remained unchanged, but 35% material declined to 6¼c and 50% to 6⅜c. Statistically, both lead and zinc have changed very little to date, but the outlook for increasingly greater amount of stocks seems certain unless basic conditions change quickly or production is cut radically.

Casein prices after several months of comparative price stability dropped ½c to a basis of 12½c for 20-30 mesh and 13c for 80-100 mesh. Little interest on the part of buyers caused an accumulation of stocks and this situation may be further aggravated shortly by the arrival of Argentine material. The trade generally does not now expect that this winter's price will reach the levels of last by a rather wide margin.

Further Reduction in Vermilion

A further reduction of 5c was made in quotations on vermilion following a similar decline late in September, directly caused, of course, by the weakness in metallic mercury. The current price is now $1.65 in 500 lb. lots.

Prices for earth and chemical colors remain unchanged in the face of a very light demand. Tonnages of carbon black moving into the Akron area have proved disappointing. Tire production is still in the doldrums. So far no announcement has been made of carbon black prices for '38 and producers are said to be waiting on action on the part of the Texas legislature on the subject of gas taxes.

Carbon Black Reduced

Carbon black prices were reduced ½c, effective November 1st. Increasing competition and poor demand were contributing causes. Carlots in bags, delivered New York, are now .0485c per lb.; at Gulfport, .0395c.

An unexpected $5 a ton decline in lead November 3rd caused an additional ¼c reduction in lead oxides. Reductions were limited to ordinary grades. No change has been made in the special grades.

The lethargy in colors is duplicated in the situation in fillers, extenders, and inert pigments. Volume moving into consumption is greatly below the usual seasonal total. Quotations on chrome colors have not shifted despite the sharp declines in metallic lead. In most quarters no revision is anticipated until Jan. 1st unless the metal sags further. Producers point out that they failed to readjust prices upward to the degree that was warranted by the former high price for lead and therefore do not feel that they should make concessions on the way down.

Paint Sales Below '36 Level

September paint, varnish, lacquer and filler sales for 580 establishments totaled $34,489,882, against $35,305,043 in August, and $34,799,558 in September a year ago. This was the first month so far this year that sales have fallen below the figure for the corresponding total for '36. Total sales for the first 9 months amounted to $340,858,094, against $302,694,856 in the corresponding period of last year. September sales showed $18,166,243 through trade channels and $12,993,944 through industrial outlets. Of the industrial sales, $9,023,194 were paint and varnish, and $3,970,750 were lacquer. In August industrial paint and varnish sales totaled $9,230,886 and lacquer sales in industrial channels totaled $4,286,992.

Construction Totals Off 10%

September construction operations in 37 Eastern states fell almost 10% below the level for September a year ago, and were 28% below the August total, according to the F. W. Dodge Corp. September total for all classifications amounted to $207,071,800, as against $234,271,500 in September a year ago and $285,104,100 for August. According to Vice-President T. S. Holden of the Dodge organization, privately financed building and engineering work in '38 should approximate the '37 figures, but he looks for a decline in publicly financed projects which would make the total below the current year's figures.

Dextrin, Starch Sharply Reduced

Natural Varnishes Steady in Face of Light Demand—Zinc Dust Lower—Natural Tanstuffs Move Higher—Shellac Markets Quiet—Rosin Prices Sink to New Lows for the Year—Candelilla Higher on Reports of Mexican Export Tax—

Natural Raw Materials

Important Price Changes		
ADVANCED		
	Oct. 30	Sept. 30
Mangrove bark	$26.50	$25.50
Myrobalans J1	30.00	29.00
J2	22.50	20.50
R2	22.00	20.00
Sumac, grd.	61.00	60.00
Valonia	52.00	49.00
Wax candelilla	.15	.13
DECLINED		
Corn sugar, tanners	$3.50	$3.79
Corn syrup 42°	3.61	3.91
43°	3.66	3.96
Dextrin, British	4.30	4.60
Corn, canary	3.95	4.25
White	4.00	4.30
Starch, corn, pearl	3.48	3.78
Powdered	3.58	3.88
Zinc dust	.0765	.0915

Lower grain prices, particularly in corn, are reflected in the sharp decline in dextrin. In fact two reductions of 15c each were announced and similar losses were recorded on starch. Egg products were nominal because of the uncertainty of obtaining replacements from China. Zinc dust went to a new low for the year as a result of the break in the metal. Higher prices prevailed for natural dyestuffs and tanstuffs, increases being noted in mangrove bark, myrobalans, valonia, sumac, and wattle bark. Rises took place despite light demand and were largely caused by reports of firmer replacement values.

Strangely few changes in domestic prices for the natural varnish gums were announced in October. Demand slumped quite noticeably and indications from primary sources pointed to higher replacement costs, yet little revamping in the price structure was reported. The most plausible explanation advanced was that domestic stocks have increased considerably due to slackened demand, with the result that momentarily the market is not following normal market conditions. Any sudden improvement would, however, it is said, reverse the situation immediately with higher prices inevitable.

Little or no improvement was reported in movement of shellac into consuming industries. The generally lower prices in international commodities were duplicated in the primary shellac markets in Calcutta and London. Locally a ½c decline in T. N. Superfine was the only announced price change made during the month.

In the waxes higher prices were reported for candelilla largely caused by a Mexican Government tax on exports and reports that that Government would institute rigid control over output. Some firmness was given to the market for carnauba by reports that shipments of new crop might be delayed and that certain of the producing states might introduce higher export duties. Fear of possible shortages of Japan wax has been corrected somewhat by the fact that shipments are coming through from the Far East. As a result prices have eased slightly. Nevertheless, consumers are reported to be covering requirements for several months ahead, fearing that interruptions may occur.

Strikes at Primary Ports

To add to the difficulties of the naval stores industry labor troubles developed at the primary ports last month with the result that stocks increased at Savannah and Jacksonville. Labor problems have also arisen at many producing points in the interior. Rosin took the play away from turpentine last month in the matter of price declines. Despite plans for crop curtailment the sudden dropping of the bottom out of the security and commodity markets here and abroad had a most depressing effect all around. Sales for both domestic and foreign accounts lacked any snap. Add to these adverse conditions fear of further government liquidation and the perfect setting for a demoralized market was present to the nth degree.

Rosin Prices Off Sharply

A comparison of end-of-the-month prices and stocks at Savannah indicates the severity of the month's losses:—

	Oct. 29	Sept. 30	Net Gain or Loss for month
Savannah:			
B	$6.25	$7.40	—$1.15
D	6.25	7.40	— 1.15
E	6.50	7.40	— .90
F	6.50	7.70	— 1.20
G	6.50	7.70	— 1.20
H	6.50	7.70	— 1.20
I	6.50	7.70	— 1.20
K	6.60	7.75	— 1.15
M	6.60	7.75	— 1.15
N	6.65	7.75	— 1.10
WG	6.85	8.10	— 1.25
WW	7.00	8.55	— 1.55
X	7.00	8.55	— 1.55
Stocks	86,441	69,709	+16,732
Turpentine	.26½	.28¾	— .02¼
Stocks	39,672	36,352	+3,320
Jacksonville:			
Rosin stocks	51,072	38,083	+12,989
Turpentine	31,859	30,663	+1,196
Pensacola:			
Rosin stocks	26,256 (Oct. 23)	25,729 (Sept. 25)	+527
Turpentine	25,385 (Oct. 23)	24,582 (Sept. 25)	+803

August Exports Sharply Higher

August exports of naval stores, gums, and resins aggregated $2,838,000, which was almost 60% above the $1,834,000 recorded for August '36. Rosin increased in quantity from 109,600 bbls. to 140,700 bbls. and the value from $1,055,000 to $2,016,000; turpentine increased from 1,462,000 to 1,848,000 gals. and in value rose from $626,000 to $645,400.

New Barytes Producer

Tennessee Mineral Products, a new company headed by H. M. Lofton of Chattanooga, will develop deposits of barytes. Columbian Carbon is planning on a new $350,000 plant in the Saxtet oil field near Corpus Christi, Tex.

Gum Suppliers Golf

First annual golf tournament of the Water Soluble Gum Association of America was held at the Ridgewood Country Club, Paramus, N. J., Tuesday, Oct. 26th. Paul A. Dunkel of Paul A. Dunkel & Co. was chairman of the golf committee and toastmaster at the dinner, at which time golf prizes for the tournament were distributed.

Prize for the low net score was awarded to C. S. Bullock, American Cyanamid and Chemical. H. E. Price, of France, Campbell and Darling, on a tie with Walter Bott of J. L. Hopkins was presented with the prize for the low net score for those in the second flight.

New In the Specialty Field

W. F. Lamoreaux, for many years general manager of Ducktown Chemical, reports formation of a new company for the manufacture of chemicals with a plant to be located near Rossville, Ga. Company will have an initial capitalization of $100,000. No details have been released as to what products will be made but it is known that a number of industrial specialties are under consideration.

The Kentucky Chemical Industries, Inc., files articles of incorporation in Ohio, listing a capitalization of $100,000. New concern succeeds the Kentucky Chemical Manufacturing Co., Covington, Ky., which under the new name, will move to Cincinnati where it is building a plant at Ivorydale. A. L. Buxton, president, and R. W. MacGregor, vice-president, of the old company, will hold the same offices in the new concern.

Sale of the Standard Chemical Wks., located near Reading, Pa., has been made to Allegheny Chemical for a reported price of $47,000. Peoples Bank of Norristown purchased the property for $15,000 after Standard Chemical filed a petition of voluntary bankruptcy.

Stocks and Bonds

Stock Values Slump on Record Trading

Chemical Stocks off 11.5% in Value—Allied Chemical off 30¾ Points in October—Third Quarter Earnings Compare Favorably with Last Year, But Are Generally under 2nd Quarter Figures—

Mathieson Profits Drop

Mathieson Alkali reports net income of $476,598 for the third quarter, as compared with $484,489 in the same period a year ago. This is equivalent to 52c a share, as against 54c in '36.

E. M. Allen, president, told stockholders that "the volume of sales during the months of July and August compare favorably with the average sales in the second quarter. In line with curtailment of general business evidenced in September we experienced a reduction in shipments, with the result that our net profits for the third quarter were slightly lower than anticipated."

Net income for the first 9 months of the year totaled $1,470,376, as compared with $1,202,372 a year ago, or $1.62 a share on 830,428 shares of common stock, as compared with $1.30. "Increased costs of manufacture, mainly due to increased wages, taxes and cost of materials, is a subject of major importance to the alkali industry," Mr. Allen stated.

Total earnings from operations in the September quarter were $1,036,734, as against $1,028,388. Net earnings from operations were $599,482, as against $603,069 a year ago. Federal income, undistributed profit and capital stock taxes aggregated $100,998, as against $94,489.

Total income in the 9 months amounted to $3,138,208, while in the same period last year the figure was $2,765,406. Federal income and other taxes, including that on undistributed profits showed a jump from $234,709 to $296,953.

Dow $1.42 for 3 Months

Dow Chemical reports consolidated net profit for 3 months ending Aug. 31st (first quarter of the company's fiscal year) equaled $1.42 a share on common stock. Included was 18c received in dividends from an affiliated company. This is the first time company has indicated quarterly earnings.

Stock values crashed with a dull thud in October culminating 4 successive months of losses.* Stock movements and dealings were reminiscent of the wild markets of late '29. Trading reached prodigious levels as shares were thrown overboard regardless of realization figures. Long lines were found in front of banks seeking funds to protect depleted margin accounts. More than 3,000,000 shares were turned over on Oct. 18th but this figure was dwarfed by the aggregate of more than 7,000,000 shares the following day when selling reached panic proportions. The strangest part of this weird goings-on is that no two authorities agree on the causes of the collapse that had been developing progressively since March.

Subsequently recovery wiped out much of the losses and the net decline for 225 issues in the *N. Y. Sun's* computation of market movements amounted to $2,914,496,102, a net depreciation of 9.6%. In the 8 months since the bull market hit its peak last February the net depreciation has amounted to 28.7%, according to the same authority.

Trend in Chemical Stocks

Common stocks of 10 leading chemical companies lost 11.5% or $401,300,816 as shown by the following compilation:—

Net Change for Month		Change in Valuation
— 7¾	Air Reduction	$19,761,384
—30¾	Allied Chemical	73,933,824
— 1¾	Commercial Solvents	4,614,536
—18¾	du Pont de Nemours	207,482,025
— 2¾	Freeport Sulphur	2,190,045
— 1¼	Mathieson Alkali	1,072,738
— 5	Monsanto Chemical	5,572,165
— ½	Texas Gulf Sulphur	1,920,000
— 9	Union Carbide	83,042,433
— 4⅜	U. S. Indust. Alcohol	1,711,666
	Total depreciation	$401,300,816
	Per cent. decline 11.5	

Earnings Analyzed

Third quarter and 9-months' earnings statements of the leading chemical companies with but few exceptions show increased profits when compared with the corresponding periods of last year. A comparison of the two 9-months' periods for 6 outstanding companies who have already reported indicates the improvement registered:—

	9 Months 1937	9 Months 1936	Net Gain or Loss
Amer. Cyanamid	$4,235,957	$2,803,266	+$1,432,691
Atlas Powder	1,264,310	1,113,738	+ 150,572
*du Pont	59,391,136	49,521,933	+ 9,869,203
Hercules Powder	4,283,823	2,931,449	+ 1,352,374
Mathieson Alkali	1,470,376	1,202,372	+ 268,004
Texas Gulf Sulp.	9,023,055	7,723,391	+ 1,299,664

* Operating income only.

Turning to a comparison of quarterly earnings of du Pont, Hercules, Mathieson, Texas Gulf Sulphur, and Carbide, the figures show increased profits for Hercules, Texas Gulf Sulphur, and Carbide in the third quarter of '37 over the corresponding period in '36, but smaller profits for du Pont and Mathieson. When comparison is made between third and second quarter earnings for the current year all of the companies mentioned show a falling off in the July-September period.

	3rd Quarter 1937	3rd Quarter 1936	2nd Quarter 1937
du Pont	$22,063,289	$23,875,048	$23,822,888
Hercules Powder	1,246,811	1,159,405	1,561,442
Mathieson Alkali	476,598	484,489	516,726
Texas Gulf Sulp.	3,145,607	2,912,383	3,777,398
Union Carbide	10,013,033	8,111,897	10,505,140

Such declines have, of course, been more or less expected. But although incoming chemical business slowed down considerably in the summer and has been reviving more slowly than usual so far in the fall because of the marked improvement earlier this year, profits for '37 as a whole are expected to establish a new record. This is the opinion expressed by Standard Statistics Co., which reports that the composite earnings of 13 leading producers this year are expected to be 20% larger than in '36, and 37% ahead of the previous '29 peak.

American chemical industry appears in a very favorable light, to prognosticator Roger W. Babson who recently advised British investors in a message to "The Financial News"—"The most attractive issues are chemicals and oils, with motors about half way."

* According to the official report of the New York Stock Exchange, stocks declined $4,200,817,319 in October. Value of chemical stocks declined from $5,762,336,199, on September 30th, to $5,241,609,970, on October 31st, a loss of $520,726,229. Average price of chemical stocks declined from $67.22 to $60.75, a net decline of $6.47.

Price Trend of Chemical Company Stocks

	Sept. 30	Oct. 8	Oct. 15	Oct. 22	Oct. 30	Price on Oct. 31, 1936	1937 High	1937 Low
Air Reduction	65	62	58¼	60¾	57¼	77¾	80¼	53
Allied Chemical	196	185	172	163	163¾	233	258½	150
Columbian Carbon	100	94⅞	89	83	...	122	125¾	75
Commercial Solvents	10⅞	10	8⅞	9	9⅛	16⅛	21¼	5
du Pont	144½	135	126¾	124¼	125¾	174	180⅛	113⅝
Hercules Powder	128¼	118	110	114¼	132	130	185	105
Mathieson Alkali	27½	27	25	25¼	25¼	36	41¾	22½
Monsanto Chemical	93	91	86	86	86	94¼	107½	79⅞
Std. of N. J.	54	53⅝	51	51	53½	68½	76	42½
Texas Gulf Sulphur	33	31⅜	29¾	30¼	32½	39	44	23¾
Union Carbide	89	85¼	79¾	79⅛	80	100½	111	67
U. S. Ind. Alcohol	26⅛	23	20	19½	21¾	39	43⅝	16⅛

Third Quarter Earnings in Detail

Cyanamid, Carbide, du Pont and Atlas Report Increased Income—Standard of N. J. Declares Extra Dividend—

American Cyanamid reports earnings for the 9 months to Sept. 30th of $4,235,957, as against $2,803,266 for the same period a year ago. This is equivalent to $1.68 a share, as compared with $1.11 in '36. In both periods there were 2,520,368 common shares outstanding, excluding shares held by subsidiary companies.

Net operating profits, after deduction of plant, selling and administrative expense but before depletion and depreciation, amounted to $8,241,970, as compared with $6,049,836. Depletion and depreciation totaled $2,026,757, as against $1,720,711 in the first 9 months a year ago. Provision for income taxes advanced from $612,628 to $869,052 for this year.

Consolidated income as reported in the statement does not include American Cyanamid's equity in the undistributed net income of certain affiliated companies in which the company does not have a majority interest.

Carbide and subsidiaries report for the third quarter ended Sept. 30th net income of $10,013,033, after provision for income and other taxes, interest on funded debt, depreciation and other charges, equal to $1.1125 a share. This compares with net income of $10,505,140, or $1.1671 a share, in the preceding quarter and $8,111,897, or 90.12c a share, in the September quarter last year.

Reported net income for the 12 months ended Sept. 30th, including certain estimates, is $43,767,144, equal to $4.86 a share. This compares with net profit of $34,024,317, equal to $3.78 a share, for the 12 months ended Sept. 30th, '36.

Earnings Statements Summarized

Company:	Annual dividends	Net income 1937	Net income 1936	Common share earnings 1937	Common share earnings 1936	Surplus after dividends 1937	Surplus after dividends 1936
Air Reduction:							
Sept. 30 quarter	§$1.00	$1,990,995	$1,939,985	*h*$.77	*h*$.76	*......	*......
Nine months, Sept. 30	§1.00	6,231,432	5,272,461	*h*2.41	*h*2.08	*......	*......
American Agricultural Chemical:							
Sept. 30 quarter	*y*8.25	20,453	23,158	.10	.11	......	......
Amer. Cyanamid:							
Sept. 30 quarter	§.60	1,391,632	1,095,263	.55	.43	......	......
Nine months, Sept. 30	§.60	4,235,957	2,803,266	1.68	1.11	......	......
Atlas Powder:							
††Sept. 30 quarter	*w*1.00	396,488	377,982	1.24	1.15	*......	*......
Nine months, Sept. 30	*w*1.00	1,264,310	1,113,737	4.03	3.28	*......	*......
Celanese Corp. of America:							
Sept. 30 quarter	*w*.75	1,025,208	......	.43	....	......	......
Nine months, Sept. 30	*w*.75	4,469,314	......	2.54	....	......	......
Certain-teed Products:							
Sept. 30 quarter	*f*....	133.529	131,208	.04	.03	......	......
Nine months, Sept. 30	*f*....	303,601	†74,547	*p*4.15	....	......	......
Commercial Solvents:							
Sept. 30 quarter	§.60	239,997	583,452	.09	.22	*......	*......
Nine months, Sept. 30	§.60	1,102,377	1,667,400	.42	.63	*......	*......
Consol. Chemical Industries:							
Sept. 30 quarter	§1.50	249,756	191,682	*c*.78	*c*.60	......	......
Nine months, Sept. 30	§1.50	927,089	434,903	*c*2.90	*c*1.36	......	......
Corn Products Refining:							
††Sept. 30 quarter	§3.00	661.154	2,985,259	.09	1.01	......	......
Nine months, Sept. 30	§3.00	5,003,040	8,339,192	1.47	2.78	*d*$1,979,584	$1,356,568
Davison Chemical:							
Sept. 30 quarter	*w*.60	81,592	9,414	....	....	......	......
Freeport Sulphur:							
Sept. 30 quarter	*y*1.50	699,518	495,638	.85	.60	......	......
Nine months, Sept. 30	*y*1.50	1,979,360	1,510,510	2.41	1.82	......	......
General Printing Ink:							
††Sept. 30 quarter	*w*.30	269.625	291,519	.30	.32	......	......
Nine months, Sept. 30	*w*.30	986,492	856,743	1.13	.95	......	......
Hercules Powder:							
Sept. 30 quarter	6.00	1,246,811	1.159,405	*j*1.87	*j*1.72	......	......
Nine months, Sept. 30	6.00	4,283,823	2,931,449	*j*6.57	*j*4.23	......	......
Industrial Rayon:							
Sept. 30 quarter	*w*.50	16,544	466.481	*h*.02	*h*.77	*......	*......
Nine months, Sept. 30	*w*.50	197,916	923,557	*h*.26	*h*1.52	*......	*......
Penick & Ford:							
Sept. 30 quarter	*w*.25	36,580	289,431	.10	.78	......	......
Nine months, Sept. 30	*w*.25	72,699	982,486	.20	2.66	......	......
Procter & Gamble:							
Sept. 30 quarter	§2.00	5,044,338	6,629,564	.76	1.01	......	......
Texas Gulf Sulphur:							
Sept. 30 quarter	§2.00	3.145,607	2,912,383	.82	.76	1,225,607	992,383
‡‡Nine months, Sept. 30	§2.00	9,023,055	7,723.391	2.35	2.01	2,303,055	1,963,391
Twelve months, Sept. 30	§2.00	11,152,679	9,926,198	2.90	2.58	......	......
Union Carbide & Carbon:							
Sept. 30 quarter	3.20	10,013,034	8,111,897	1.11	.90	......	......
‡‡Nine months, Sept. 30	3.20	30,465,886	23,550,950	3.38	2.61	......	......
Twelve months, Sept. 30	3.20	43,767,144	34,024,317	4.86	3.78	......	......
Westvaco Chlorine Products:							
Sept. 30 quarter	1.00	216,494	128,236	*h*.42	*h*.23	......	......
Nine months, Sept. 30	1.00	627,850	419,205	*h*1.21	*h*.98	......	......

§ Plus extras. *h* On shares outstanding at close of respective periods. * Not available. *y* Amount paid or payable in 12 months to and including the payable date of the most recent dividend announcement. *w* Last dividend declared, period not announced by company. †† Indicated quarterly earnings as shown by comparison of company reports for the six and nine months period. *f* No common dividend. † Net loss. *p* On preferred stock. *c* On combined Class A and Class B shares. *d* Deficit. *j* On average shares.

Du Pont 9-Months' Net Higher

Du Pont operating income for the first 9 months of '37 was announced as $59,391,136, against $49,521,933 in the same period in '36, and balance after reserves for depreciation and obsolescence was given as $47,282,362, against $38,167,630.

With income from investments in General Motors at $22,002,195, against $29,333,949, and other income at $3,097,528, against $2,508,002, income for the 9 months totaled $72,382,085, against $70,009,581. Net income after taxes and charges was $62,799,523, compared with $62,567,019 in the 1936 period.

Complete figures for the third quarter show a net profit of $22,063,289, equal to $1.92 a share on the common stock, compared with $23,875,048, or $2.04 a share, in the '36 quarter. Operating income was $18,636,158, against $17,322,927, and total income, $25,617,476, against $26,789,235.

The surplus at Sept. 30th stood at $243,779,570, reflecting $8,500,000 addition through revaluation of the General Motors investment and transfer of $1,250,000 to capital stock account in connection with the issue and sale of 500,000 shares of $4.50 preferred stock on June 30th. At Dec. 31st earned surplus was $226,236,595.

Lammot du Pont, president, in announcing the result of operations for the 9 months, pointed out that the company and its subsidiaries paid out in wages and salaries approximately $81,000,000 to about 60,000 employees, which of course does not include any employees of General Motors.

Atlas Increases Income

Atlas Powder reports for the 9 months ended on Sept. 30th a net income of $1,264,310, equal, after preferred dividends, to $4.03 a common share, compared with $1,113,738, or $3.28 a share for the same period in '36. Earnings for the '37 period include provision for the surtax and undistributed profits tax. Earnings for the third quarter of the current year were equivalent to $1.24 a share on the common stock against $1.15 a share in the same quarter last year.

Sales for the 9 months amounted to $13,560,145, compared with $11,784,531, an increase of 15%. Current assets as of Sept. 30th amounted to $9,399,388, and were 7.7 times current liabilities.

Dividend News

Directors of the Standard of N. J. have declared an extra of 75c a share in addition to the regular semi-annual dividend of 50c on the capital stock. Both dividends are payable on Dec. 15th, to stockholders of record of Nov. 15th.

Chemical Stocks and Bonds

Oct. Last	1937 High	1937 Low	1936 High	1936 Low	1935 High	1935 Low	Sales: Number of shares Oct. 1937	Sales: Number of shares 1937	Stocks	Par $	Shares Listed	Dividends*	Earnings** $-per share-$ 1936	Earnings** $-per share-$ 1935
NEW YORK STOCK EXCHANGE														
57¼	80¼	53	86½	58	57½	35	38,100	233,500	Air Reduction	No	2,523,065	$2.50	2.79	2.10
163¾	258½	150	245	157	173	125	44,000	153,500	Allied Chem. & Dye	No	2,214,099	6.00	11.44	8.71
66	101½	53½	89	49	57¾	41½	5,900	59,800	Amer. Agric. Chem.	No	210,934	2.50	4.71	6.37
15	30¾	8¼	35⅜	20½	35¾	22½	44,500	195,500	Amer. Com. Alcohol	20	260,947	.50	4.55	3.16
34¾	46	31	50	37	52	36	6,500	48,800	Archer-Dan-Midland	No	549,546	3.00	3.20	3.46
55	94	40½	84	48	48½	32¾	6,000	38,500	Atlas Powder Co.	No	248,660	3.50	4.21	2.81
115	133	112¾	131	112	115	106¾	110	3,790	5% conv. cum. pfd.	100	88,781	5.00	20.86	16.93
26	41¼	17	32¼	21¾	35⅜	19½	103,300	1,506,000	Celanese Corp. Amer.	No	1,000,000	1.50	2.25	1.99
100	115	100	116	106	111¼	97½	500	12,600	prior pfd.	100	164,818	7.00	27.25	35.34
12⅝	25¾	8½	21¼	13	21	15⅛	82,700	707,300	Colgate-Palm.-Peet	No	1,956,086	.75	1.40	1.36
97	104½	97	106½	100	107¼	101	1,400	15,400	6% pfd.	100	246,496	6.00	17.12	16.79
88	125¾	75	136½	94	101¼	67	11,100	50,000	Columbian Carbon	No	537,586	5.75	7.48	5.56
9⅛	21¼	5	24⅝	14¼	23⅞	16½	167,400	871,700	Commercial Solvents	No	2,635,371	.80	.84	1.02
56¼	71¼	50½	82½	63⅝	78⅜	60	48,700	263,200	Corn Products	25	2,530,000	3.75	3.86	2.62
155	171½	153	170	158	165	148¼	800	9,100	7% cum. pfd.	100	243,739	7.00	46.76	33.97
38¼	76⅛	38¼	63	42	50⅜	35½	600	16,900	Devoe & Rayn. A	No	95,000	2.00	4.49	2.89
98	159¼	94	142¼	94⅛	105½	80½	12,200	45,100	Dow Chemical	No	945,000	2.40	4.48	3.43
125¾	180⅛	113⅝	184¾	133	146½	86⅝	89,100	403,500	DuPont de Nemours	20	11,049,470	6.10	7.56	5.04
109½	109¾	107½			...	...	1,400	1,400	4½% pfd.	100	500,000	4.50	.....	.....
133	135½	130	136½	129	132	126⅞	2,300	19,400	6% cum. deb.	100	1,092,699	6.00	84.21	56.81
168	198	145	185	156	172¼	110½	31,200	129,700	Eastman Kodak	No	2,250,921	6.75	8.24	6.90
163	163	150	166	152	164	141	210	3,360	6% cum. pfd.	100	61,657	6.00	306.64	258.09
22¾	32¼	18	35⅝	23½	30⅝	17¼	28,900	271,300	Freeport Texas	10	796,380	1.00	2.43	1.78
109	117	102	135	108	125	112½	1,230	2,700	6% conv. pfd.	100	12,031	6.00	163.38	121.30
29½	51½	20¼	55¼	39½	49½	23⅜	33,400	230,200	Glidden Co.	No	603,304	2.00	3.29	2.91
44	58⅛	43	56	52¼	...	...	1,700	19,900	4½% cum. pfd.	50	200,000	2.25	15.43	.....
98	117½	80⅛	133	99⅝	119½	85	3,400	24,600	Hazel Atlas	25	434,409	7.64	6.56	7.58
132	105	185	150	84	90	71	13,900	39,800	Hercules Powder	No	583,672	5.44	6.33	4.23
128	135½	125	135	126	131	122	670	2,820	6% cum. pfd.	100	105,765	6.00	48.97	36.30
24⅝	47½	16	41⅜	25⅝	36⅜	23½	51,500	393,900	Industrial Rayon	No	606,500	2.10	2.24	1.00
30⅝	64¼	20	48	37	42¾	21½	6,800	15,600	Interchem.	No	288,358	2.75	3.02	2.74
106	111½	100	112	107	110	98½	1 0	2,190	6% pfd.	100	66,917	6.00	18.97	17.19
3⅞	9⅛	2	5⅞	2⅞	5	2⅜	55,700	693,300	Intern. Agricul.	No	436,049	None	—1.55	—.99
29½	63½	18¼	36¾	29¾	42¾	26	10,000	119,800	7% cum. pr. pfd.	100	100,000	None	.23	2.69
47½	73⅜	39¾	80¼	47¼	47¼	22¼	502,000	2,198,300	Intern. Nickel	No	14,584,025	1.30	2.40	1.65
21	28¾	19½	30	23	36¼	25	2,100	14,900	Intern. Salt	No	240,000	2.00	1.65	1.32
21½	36	20	42⅜	27½	36¼	31	2,800	19,100	Kellogg (Spencer)	No	500,000	1.60	2.62	2.22
48½	79	38½	80¼	47¼	49¼	21½	53,800	283,200	Libbey Owens Ford	No	2,503,168	3.50	4.15	3.26
19½	26⅞	14	36½	26⅛	37¼	24½	28,600	146,700	Liquid Carbonic	No	684,812	.80	1.58	1.29
26¼	41¾	22½	42⅜	27½	33⅞	23¾	16,900	115,400	Mathieson Alkali	No	830,428	1.50	1.76	1.44
88	107½	79⅞	103	79	94¾	55	21,000	112,800	Monsanto Chem.	10	1,114,409	3.00	4.01	3.84
108	109	105	...	...	...	...	600	600	4½% pfd.	100	50,000	4.50	.....	.....
27¼	44	18	40	9	20⅝	14½	70,200	470,300	National Lead	10	3,095,100	.875	1.71	1.08
153	171	153	164	125	162½	150	400	5,600	7% cum. "A" pfd.	100	213,793	7.00	33.83	25.40
130	150	127	147	137¾	140½	121⅝	350	2,100	6% cum. "B" pfd.	100	77,462	6.00	74.50	49.05
18⅛	41¾	10⅛	40	9	10⅞	4⅜	142,200	857,000	Newport Industries	1	519,347	.60	.98	.57
70	103¾	63	82	64	64½	40	42,100	165,900	Owens-Illinois Glass	25	2,661,204	3.00	3.80	3.29
49½	65½	43¼	56	40¼	53¼	42⅜	35,600	156,900	Procter & Gamble	No	6,410,000	1.87	2.39	2.32
118	118½	114½	122½	115¾	121	115	840	4,740	5% pfd. (ser. 2-1-29)	100	171,569	5.00	94.14	88.15
8⅝	15⅜	5¼	13	5⅝	8¾	4	67,700	464,900	Tenn. Corp.	5	853,696	.15	.47	.22
32½	44	23¾	44¾	33	36¾	28¾	52,100	746,900	Texas Gulf Sulphur	No	2,540,000	2.50	.....	1.94
80	111	67	105¼	71⅝	75¾	44	154,300	588,600	Union Carbide & Carbon	No	8,903,138	2.30	4.09	3.06
65	91	55	96¾	68	78	46	12,900	80,900	United Carbon	No	397,877	4.05	5.54	4.71
21¾	43⅝	16⅛	59	31¼	50⅝	35⅛	42,400	124,700	Vanadium Corp. Amer.	No	391,033	1.00	—.20	2.16
18¾	39⅜	9¼	30½	16¼	21¾	11¼	61,500	797,000	U. S. Indus. Alco.	No	366,637	None	.40	—1.13
4¾	12¾	2⅜	8½	4⅜	4⅝	2½	79,500	791,600	Virginia-Caro. Chem.	No	486,000	None	—2.56	—.79
30	74⅜	18½	58¾	28¾	35¾	17½	30,300	276,400	6% cum. part. pfd.	100	213,392	None	.16	4.20
16	27¼	10¾	32	19¾	25½	16¾	10,300	53,200	Westvaco Chlorine	No	284,962	.75	1.39	1.63
25½	34⅞	24	35¼	31¾	...	...	3,800	33,200	Westvaco Chlorine, cum. pfd.	30	192,000	1.50	3.26	.....
NEW YORK CURB EXCHANGE														
26	37	17⅝	40¾	29¼	30	15	98,400	596,900	Amer. Cyanamid "B"	No	2,404,194	1.00	1.77	1.61
1⅛	2⅞	1⅛	3¾	2⅛	4	2	1,200	17,600	British Celanese Am. R.	10	2,806,000	None	—4.53	—.71
93	124	92	116¼	99¼	115	90	1,250	15,100	Celanese, 7% cum. 1st pfd.	100	148,179	7.00	24.47	21.96
5⅛	15	3	16½	9	15	7	2,300	15,200	Celluloid Corp.	15	194,952	None	—.80	—.95
12⅝	14⅝	12	15	11⅞	14½	11⅝	3,100	7,850	Courtaulds' Ltd.	1 £	24,000,000	7½%	8.40%	7.51%
6¾	10⅝	3½	10¾	5	12½	6¼	4,900	63,900	Duval Texas Sulphur	No	500,000	.50	.61	.16
33	47½	32	55	39	58	37	1,100	13,700	Heyden Chem. Corp.	10	149,997	2.25	3.56	3.22
92	147½	82	140	98¼	97¼	46¾	11,600	68,000	Pittsburgh Plate Glass	25	2,142,443	6.00	7.15	5.32
92	154¾	85	154½	117	128⅞	84	11,650	55,650	Sherwin Williams	25	635,583	4.00	8.04	6.19
108	114	106¼	116	110	113½	106	210	2,840	5% pfd. cum.	100	155,521	5.00	41.44	33.17
PHILADELPHIA STOCK EXCHANGF														
142	179	115	179	114¾	116¾	76½	2,250	8,325	Pennsylvania Salt	50	150,000	8.50	10.59	7.74

Oct. Last	1937 High	1937 Low	1936 High	1936 Low	1935 High	1935 Low	Sales Oct. 1937	Sales 1937	Bonds	Date Due	Int. %	Int. Period	Outstanding $
NEW YORK STOCK EXCHANGE													
103¼	109½	99	117½	107¾	116	104½	737,000	4,161,000	Amer. I. G. Chem. Conv. 5½'s	1949	5½	M. N.	29,929,000
30	42½	23	42½	27½	29¾	7⅜	201,000	2,164,000	Anglo Chilean Nitrate inc. deb.	1967	4½-5		12,433,000
101	102¼	100⅛	...	...	...	...	27,000	27,000	Dow Chemical	1951	3	J. D.	5,000,000
99½	102	99½	102¾	96¾	100¼	91⅛	86,000	360,000	Int. Agric. Corp. 1st Coll. tr. stpd. to 1942	1942	5	M. N.	5,994,100
28½	35⅜	21¼	39	21	21½	7	41,000	3,031,000	Lautaro Nitrate conv. b's	1954	6	J. J.	31,357,000
28¾	28¾	20¾	35	23½	38	32⅛		25,000	Ruhr Chem. 6's	1948	6	A. O.	3,156,000
98	105	93½	105	103	104	91½	26,000	290,000	Tenn. Corp. deb. 6's "B"	1944	6	M. S.	3,007,900
89½	111	89	98½	85¾	94¼	66	153,000	1,672,000	Vanadium Corp. conv. 5's	1941	5	A. A.	4,261,000

* Paid in 1936, including extras; ** For either fiscal or calendar years.

Industrial Trends

Business Activity Dips Below Corresponding Months of Last Year—Causes Not Clearly Defined—Steel Operations at 52%—Automotive Industry Expanding Operations Cautiously—

The progressive decline in general business activity which started early in the summer reached acute proportions in October and was climaxed by demoralization of stock values in the middle of the month.

Rarely, if ever, in the history of the steel industry has so sharp a decline in production occurred within so short a time. As late as Sept. 27th steel activity was at 74.4%, but on Oct. 25th it had fallen to 52.1%, with all indications of still further recession. It is now quite apparent that stocks in the hands of consumers and jobbers at the end of the summer were larger than was generally realized even by the steel industry itself. Until such time as surplus stocks are removed the industry will probably flounder in the doldrums. Improvement in purchasing by the automotive field is expected, but purchasing by the railroads on any extensive scale probably will hinge on the granting of further rate increases.

The automotive field is perhaps the only important division of industry which is expanding at the moment and even here a great deal of caution is apparent. Definite reductions in manufacturing operations are reported in textiles, leather, shoes and paper. Building figures have taken a downward direction. Seasonal expansion in paints, rubber, and glass has so far failed to materialize and these industries are just about holding to reduced schedules in effect during July and August.

With price declines in the past month outnumbering advances 3 to one, a general decline in the commodity price level has accompanied the crack-up on the stock market. The severest reactions took place in farm products and in the metals. For the first time since recovery began many price indices are below the levels of a year earlier. All of the important indices of business activity reflect the current slump; that of *The N. Y. Times* on Oct. 23rd stood at 97.9 as compared with 101.2 on Oct. 24, 1936. Industrial output in October, as measured by the Federal Reserve Board index of production, probably fell almost 8% below the level registered by the index for that month a year ago, according to a survey made at the close of the month.

Again sounding a strong note of caution, the business survey committee of the National Association of Purchasing Agents suggests that purchases, for the time being, should be kept on a hand-to-mouth basis wherever possible.

The Tri Continental Corp. in a recently completed business survey states: "In contrast to the optimism prevailing everywhere in January, when we made our last broad investigation, this time we have found a distinctly cautious attitude. In January forward buying was heavy, prices were advancing rapidly, and industrial operations were expanding. During the past month, the reverse has been true. . . Comparisons with last year are becoming increasingly less favorable, and at the same time manufacturing costs are substantially higher in most cases than they were a year ago."

The report continues—"When a business decline, such as the present one, is still in its initial stages and is still gaining momentum, it is always difficult to gauge how far it will go and how long it will last. Particularly is this true at a time when, as now, such old-fashioned economic fundamentals as a free gold standard, a balanced government budget, and a system of taxation tending to encourage rather than to penalize industry and saving, have been replaced by a 'managed economy.' It is the substitution of 'management' for these fundamentals which is so disturbing at a time like this."

Business activity during the final quarter is hardly likely to recover sufficiently to top the level for the corresponding period of last year. Retail sales probably will be better in the agricultural areas than in the industrial centers where employment figures have again turned downward. Consumer inventories are expected to show substantial reductions by the first of the year, stimulating expansion in manufacturing, but because of the high level of operations in the first quarter of '37 it will be surprising if business in the first few months of '38 does not fall below the pace maintained in January, February and March of this year.

For the moment we are too close to the trees to observe the forest. Whether the current recession is a normal reaction in a broad recovery movement and likely to end quickly, or is a severe recession that may take a year or more to complete, none can say with certainty now.

Statistics of Business

	September 1937	September 1936	August 1937	August 1936	July 1937	July 1936
General:						
Acceptances, outst'd'g *c*	......	......	$343	$308	$352	$315
Coal Prod., anthracite, tons	3,507,000	3,874,000	2,436,930	2,917,377	2,421,504	3,345,309
Coal Prod., bituminous, tons	......	......	33,665,000	33,086,000	31,912,000	32,005,000
Com. Paper, outst'd'g *c*	......	......	$329	$205	$324	$187
Failures, Dun & Bradstreet	......	......	707	655	618	639
Factory Payrolls, totals†	......	......	103.7	83.4	101.2	80.2
Factory Employment†	......	......	102.2	93.4	101.7	92.8
Merchandise Imports‡	......	......	$245,707	$193,073	$265,349	$193,622
Merchandise Exports‡	......	......	$277,695	$178,975	$268,185	$178,324
Manufacturing:						
Automotive Production	171,203	135,165	394,322	371,274	438,968	440,731
Boot & Shoe Production				..	34,623,669	35,678,092
Bldg. Contracts, Dodge*‡	$207,072	$234,272	$285,104	$275,281	$321,602	$294,735
Newsprint Production:						
Canada, tons	......	......	318,713	270,053	314,529	274,627
U. S., tons	......	......	80,311	73,673	78,205	73,361
Plate Glass Prod., sq. ft.	......		17,898,064	18,710,040	15,344,855	
Steel Ingots Prod., tons	4,301,869	4,151,388	4,875,671	4,184,287	4,556,596	3,914,370
% Steel Activity	76.52	74.05	83.79	72.11	78.49	67.61
Pig Iron Prod., tons	......	......	3,605,818	2,711,721	3,498,858	2,594,268
U. S. Consumption, crude rubber, tons	43,893	46,449	41,456	46,777	......	48,127
Tire Shipments	......	......	......	......	5,190,107	5,743,867
Tire Production	......	......	......	......	4,291,660	5,466,252
Tire Inventory	......	......		......	11,654,114	7,749,847
Cotton Consumption, bales	......		604,380	575,014	583,066	607,056
Cotton spindles operating	23,886,948	23,518,904	24,353,102	23,433,658	24,394,300	23,251,764
Chemical:						
Chemical Employment†*a*	......	......	137.1	123.0	139.5	122.5
Chemical Payrolls†*a*	......	......	156.1	117.7	153.9	114.9

Week Ending	Carloadings 1937	Carloadings 1936	Carloadings % of Change	Electrical Output§ 1937	Electrical Output§ 1936	Electrical Output§ % of Change	Jour. of Com. Price Index	Nat'l Fertilizer Ass'n Price Indices: Chem. & Drugs	Fats & Oils	Fert. Mat.	Mixed Fert.	All Groups	‡‡Labor Dept. Chem. & Drug Price Index	% Steel Activity	N. Y. Times Index Bus. Act.	Fisher's Index Pur. Power
Sept. 25	840,446	807,243	— 4.1	2,265,748	2,170,807	+ 4.4	88.8	95.6	70.6	72.6	80.4	87.1	81.2	74.4	103.9	108.5
Oct. 2	847,245	819,597	— 3.4	2,275,724	2,157,278	+ 5.5	87.2	95.6	70.7	73.8	80.4	86.0	81.0	66.1	103.5	110.2
Oct. 9	815,122	820,570	— 0.7	2,280,065	2,169,442	+ 5.1	85.5	95.6	69.7	73.8	80.4	84.3	81.2	63.6	101.1	111.4
Oct. 16	809,944	826,525	— 2.0	2,276,123	2,168,487	+ 5.0	86.1	95.6	68.8	73.8	80.5	83.9	80.9	55.8	100.2	111.7
Oct. 23	......	......	.....	2,281,636	2,170,137	+ 5.1	85.2	95.6	67.4	72.8	80.5	83.3	80.6	52.1	97.9	111.9
Oct. 30	......	......	.....	2,254,947	2,166,656	+ 4.1	...	...	...	...	...	...	...	...	...	...

c 000,000 omitted, as end of month; * 37 states; † Dept. of Labor 3-year average, 1923-1925 = 100.0; ‡ 000 omitted; § K.W.H., 000 omitted; *a* Includes all allied products, but not petroleum refining; ‡‡ 1926-1928 = 100.0; *x* Dept. of Commerce; *y* Preliminary; *z* Revised.

Prices Current

Heavy Chemicals, Coal-tar Products, Dye-and-Tanstuffs, Colors and Pigments, Fillers and Sizes, Fertilizer and Insecticide Materials, Petroleum Solvents and Chemicals, Naval Stores, Fats and Oils, etc.

Chemical prices quoted are of American manufacturers for spot New York, immediate shipment, unless otherwise specified. Products sold f. o. b. works are specified as such. Import chemicals are so designated. Resale stocks when a market factor are quoted in addition to maker's prices and indicated "second hands."

Oils are quoted spot New York, ex-dock. Quotations f. o. b. mills, or for spot goods at the Pacific Coast are so designated.

Raw materials are quoted New York, f. o. b., or ex-dock. Materials sold f. o. b. works or delivered are so designated.

The current range is not "bid and asked," but are prices from different sellers, based on varying grades or quantities or both. Containers named are the original packages most commonly used.

Purchasing Power of the Dollar: 1926 Average—$1.00 - 1936 Average $1.18 - Jan. 1937 $1.11 - October 1937 $1.11

	Current Market		1937 Low	1937 High	1936 Low	1936 High
Acetaldehyde, drs, c-l, wks lb.	...	.14	...	.14	...	.14
Acetaldol, 95%, 50 gal drs wks lb.	.21	.25	.21	.25	.21	.25
Acetamide, tech, lcl, kegs lb.	.32	.43	.32	.43	.38	.43
Acetanalid, tech, 150 lb bbls lb.	.24	.26	.24	.26	.24	.26
Acetic Anhydride, 100 lb cbys lb.	.20	.24	.20	.24	.21	.25
drs, f.o.b. wks, frt all'd lb.	.13	.15	.13	.15	...	.15
Acetin, tech, drs lb.	...	.33	.22	.33	.22	.24
Acetone, tks, f.o.b. wks, frt allowed lb.	...	.05	.05	.06½	.06	.11
drs, c-l, f.o.b. wks, frt all'd lb.	...	.06	.06	.07½	.07	.12
Acetyl chloride, 100 lb cbys lb.	.55	.68	.55	.68	.55	.68
ACIDS						
Abietic, kgs, bbls lb.	.09¾	.10	.06¾	.10	.06¾	.07
Acetic, 28%, 400 lb bbls, c-l, wks 100 lbs.	...	2.38	2.25	2.53	...	2.45
glacial, bbls, c-l, wks 100 lbs.	...	8.43	8.00	8.70	...	8.43
glacial, USP, bbls, c-l, wks 100 lbs.	...	10.25	10.50	12.43	...	12.43
Acetylsalicylic, USP, 225 lb bbls lb.	...	.60	.50	.60	...	...
Adipic, kgs, bbls lb.	...	.72	...	.72	...	.72
Anthranilic, ref'd, bbls lb.	.95	1.00	.85	1.00	.85	.95
tech, bbls lb.	...	.75	...	.75	...	.75
Battery, cbys, wks 100 lbs.	1.60	2.55	1.35	2.60	1.35	2.50
Benzoic, tech, 100 lb kgs lb.	.43	.47	.43	.47	.40	.45
USP, 100 lb kgs lb.	.54	.59	.54	.59	.54	.59
Boric, tech, gran, 80 tons, bgs, delv ton *a*	...	95.00	...	95.00	...	95.00
Broenner's, bbls lb.	...	1.11	...	1.11	1.11	1.25
Butyric, edible, c-l, wks, cbys lb.	1.20	1.30	1.20	1.30	1.20	1.30
synthetic, c-l, drs, wks lb.	...	.22	...	.22	...	.22
wks, lcl lb.	...	.23	...	.23	...	.23
tks, wks lb.	...	.21	...	.21	...	.21
Camphoric, drs lb.	5.50	5.70	5.50	5.70	...	5.25
Chicago, bbls lb.	...	2.10	...	2.10	...	2.10
Chlorosulfonic, 1500 lb drs, wks lb.	.03½	.05	.03½	.05	.03½	.05
Chromic, 99¾%, drs, delv lb.	.14¾	.16¾	.14¾	.16¾	.14¾	.16¾
Citric, USP, crys, 230 lb bbls lb. *b*	.24	.25	.24	.26	.25	.29
anhyd, gran, bbls lb. *b*	...	.26½	.26½	.29	.29	.31
Cleve's, 250 lb bbls lb.	.50	.52	.50	.52	.50	.54
Cresylic, 99%, straw, HB, drs, wks, frt equal gal.	.89	.91	.72	.91	.51	.74
99%, straw, LB, drs, wks, frt equal gal.	.92	.94	.77	.94	.68	.79
resin grade, drs, wks, frt equal lb.	.10¾	.11¼	.09	.11¼	.52*y*	.65*y*
Crotonic, drs lb.	.75	1.00	.75	1.00	.90	1.00
Formic, tech, 140 lb drs lb.	.11	.13	.11	.13	.11	.13
Fumaric, bbls lb.	...	.60	...	.60	...	.60
Fuming, see Sulfuric (Oleum)						
Gallic, tech, bbls lb.	.75	.79	.65	.75	.65	.68
USP, bbls lb.	.87	.91	.77	.91	.70	.80
Gamma, 225 lb bbls, wks lb.	...	.85	...	.85	.80	.85
H, 225 lb bbls, wks lb.	.50	.55	.50	.55	.50	.55
Hydriodic, USP, 10% sol. cbys lb.	.50	.51	.50	.51	.50	.51
Hydrobromic, 34% com 155 lb cbys, wks lb.	.42	.44	.40	.42	...	...
Hydrochloric, see muriatic.						
Hydrocyanic, cyl, wks lb.	.80	1.30	.80	1.30	.80	1.30
Hydrofluoric, 30%, 400 lb bbls, wks lb.	.07	.07½	.07	.07½	.07	.07½
Hydrofluosilicic, 35%, 400 bbls, wks lb.	.10½	.15	.10½	.15	.11	.12
Lactic, 22%, dark, 500 lb bbls lb.	.02½	.02¾	.02½	.02¾	.02½	.05
22%, light ref'd, bbls lb.	.03½	.03¾	.03½	.03¾	.03½	.07
44%, light, 500 lb bbls lb.	.05½	.05¾	.05½	.05¾	.05½	.12
44%, dark, 500 lb bbls lb.	.06½	.06¾	.06½	.06¾	.06½	.10
50%, water white, 500 lb bbls lb.	.10½	.11½	.10½	.11½	.10½	.14½
USP X, 85%, cbys lb.	.42	.45	.42	.50	.45	.50
Laurent's, 250 lb bbls lb.	.45	.46	.45	.46	.45	.47
Linoleic, bbls lb.	...	.20	.16	.20	.16	.16
Maleic, powd, kgs lb.	.30	.40	.29	.40	.29	.32
Malic, powd, kgs lb.	.45	.60	.45	.60	.45	.60
Metanillic, 250 lb bbls lb.	.60	.65	.60	.65	.60	.65
Mixed, tks, wks N unit	.06½	.07¼	.06½	.07¼	.06½	.07¼
S unit	.008	.009	.008	.009	.008	.009
Monochloracetic, tech, bbls lb.	.16	.18	.16	.18	.16	.18
Monosulfonic, bbls lb.	1.50	1.60	1.50	1.60	1.50	1.60
Muriatic, 18°, 120 lb cbys, c-l, wks 100 lb.	...	1.50	1.35	1.50	...	1.35
tks, wks 100 lb.	...	1.00	...	1.00	...	1.00

a Powdered boric acid $5 a ton higher in each case; USP $15 higher; *b* Powdered citric is ½c higher; kegs are in each case ½c higher than bbls. *y* Price given is per gal.

	Current Market		1937 Low	1937 High	1936 Low	1936 High
Muriatic (continued):						
20°, cbys, c-l, wks 100 lb.	...	1.75	1.45	1.75	...	1.45
tks, wks 100 lb.	...	1.10	...	1.10	1.10	1.20
22°, c-l, cbys, wks 100 lb.	...	2.25	1.95	2.25	...	1.95
tks, wks 100 lb.	...	1.60	...	1.60	...	1.60
CP, cbys lb.	.06½	.07⅛	.06½	.07⅛	.06½	.07⅛
N & W, 250 lb bbls lb.	.85	.87	.85	.87	.85	.87
Naphthenic, 240-280 s.v., drs lb.	.10	.13	.10	.14	.11	.14
Sludges, drs lb.	...	.05	.05	.10	.06	.10
Naphthionic, tech, 250 lb bbls lb.	.60	.65	.60	.65	.60	.65
Nitric, 36°, 135 lb cbys, c-l, wks 100 lb. *c*	...	5.00	...	5.00	...	5.00
38°, c-l, cbys, wks 100 lb. *c*	...	5.50	...	5.50	...	5.50
40°, cbys, c-l, wks 100 lb. *c*	...	6.00	...	6.00	...	6.00
42°, c-l, cbys, wks 100 lb. *c*	...	6.50	...	6.50	...	6.50
CP, cbys, delv lb.	.11½	.12½	.11½	.12½	.11½	.12½
Oxalic, 300 lb bbls, wks, or N. Y. lb.	.10¾	.12	.10¾	.12	.10¾	.12½
Phosphoric, 50%, USP, cbys lb.	.12	.14	.12	.14	.14	.14
50%, acid, c-l, drs, wks lb.	.06	.08	.06	.08	.06	.08
75%, acid, c-l, drs, wks lb.	.09	.10½	.09	.10½	.09	.10½
Picramic, 300 lb bbls, wks lb.	.65	.70	.65	.70	.65	.70
Picric, kgs, wks lb.	.35	.40	.35	.40	.30	.40
Propionic, 98% wks, drs lb.	...	.22	.20	.22	...	.35
80% lb.	.16	.17½	.16	.17½	.15	.17½
Pyrogallic, tech, lump, pwd, bbls lb.	...	1.05	...	...	...	...
cryst, USP lb.	1.45	1.63	1.30	1.48	...	...
Ricinoleic, bbls lb.	...	.38	.35	.38	...	...
Salicylic, tech, 125 lb bbls, wks lb.	...	.33	...	.33	...	.40
Sebacic, tech, drs, wks lb.	.37	.41	.37	.41	...	...
Succinic, bbls lb.	...	.75	...	.75	...	.75
Sulfanilic, 250 lb bbls, wks lb.	.17	.18	.17	.18	.17	.19
Sulfuric, 60°, tks, wks ton	...	13.00	12.00	13.00	11.00	12.00
c-l, cbys, wks 100 lb.	...	1.25	1.10	1.25	...	1.10
66°, tks, wks ton	...	16.50	15.50	16.50	...	15.50
c-l, cbys, wks 100 lb.	...	1.50	1.35	1.50	...	1.35
CP, cbys, wks lb.	.06½	.07½	.06½	.07½	.06½	.07½
Fuming (Oleum) 20% tks, wks ton	...	18.50	...	18.50	...	18.50
Tannic, tech, 300 lb bbls lb	.40	.47	.19	.47	.19	.40
Tartaric, USP, gran, powd, 300 lb bbls lb.	.24¾	.25¼	.21¾	.25¼	.22¾	.24
Tobias, 250 lb bbls lb.	.65	.67	.65	.67	.65	.72½
Trichloroacetic bottles lb.	2.00	2.50	2.00	2.50	2.45	2.75
kgs lb.	...	1.75	...	1.75	...	1.75
Tungstic, tech, bbls lb.	no price		2.50	2.75	1.50	1.60
Vanadic, drs, wks lb.	1.10	1.20	1.10	1.20	1.10	1.20
Albumen, light flake, 225 lb bbls lb.	.52	.60	.47	.60	.50	.60
dark, bbls lb.	.11	.15	.11	.17	.12	.17
egg, edible lb.	...	1.05	.76	1.05	.77	1.05
vegetable, edible lb.	.74	.78	.76	.78	.65	.70
ALCOHOLS						
Alcohol, Amyl (from Pentane)						
tks, delv lb.	...	.123	...	.123	.123	.143
c-l, drs, delv lb.	...	.133	...	.133	.133	.150
lcl, drs, delv lb.	...	.143	...	.143	.143	.157
Amyl, secondary, tks, delv lb.	...	.08½	...	.08½	.08½	.108
Benzyl, cans lb.	.70	1.10	.65	1.10	.65	1.10
Butyl, normal, tks, f.o.b. wks, frt allowed lb. *d*	...	.09	.08½	.09	.08½	.11
c-l, drs, f.o.b. wks, frt allowed lb. *d*	...	.10	.09½	.10	.09½	.12
Butyl, secondary, tks, delv lb. *d*	...	.07	...	.07	.07	.096
c-l, drs, delv lb. *d*	...	.08	...	.08	.08	.106
Capryl, drs, tech, wks lb.	...	.85	...	.85	...	.85
Cinnamic, bottles lb.	2.00	2.50	2.00	3.65	2.50	3.65
Denatured, CD, No. 1*, 12, 13, c-l, drs, wks gal. *e*	...	.35	.33	.35	.30	.44*
Western schedule, c-l, wks gal. *e*	...	.28	.37	.39	.39	.52*
Denatured, SD, No. 1, tks	...	.27	.26	.27	.23	.28
c-l, drs, wks gal. *e*	...	.33	.32	.33	.29	.34
Diacetone, tech, tks, delv lb. *f*	...	.11½	...	.11½	...	.16
c-l, drs, delv lb. *f*	...	.12½	...	.12½	...	.17
Ethyl, 190 proof, molasses, tks gal. *g*	...	4.06	4.05	4.07	4.07	4.10
c-l, drs gal. *g*	...	4.12	4.11	4.12	4.11	4.27
c-l, bbls gal. *g*	...	4.13	4.12	4.13	4.12	4.28
absolute, drs gal. *g*	4.54	6.08½	4.54	6.08½	4.54	6.11½

c Yellow grades 25c per 100 lbs. less in each case; *d* Spot prices are 1c higher; *e* Anhydrous is 5c higher in each case; *f* Pure prices are 1c higher in each case.

ABBREVIATIONS—Anhydrous, anhyd; bags, bgs; barrels, bbls; carboys, cbys; carlots, c-l; less-than-carlots, lcl; drums, drs; kegs, kgs; powdered, powd; refined, ref'd; tanks, tks; works, f.o.b., wks.

	Current Market		1937 Low	1937 High	1936 Low	1936 High
Alcohols (continued)						
Furfuryl, tech, 500 lb drs lb.	.30	.35	.30	.35	...	.35
Hexyl, secondary tks, delv lb.	...	.12	.11½	.12	...	.11½
c-l, drs, delv lb.	...	.13	.12½	.13	...	.12½
Normal, drs, wks lb.	3.25	3.50	3.25	3.50	3.25	3.50
Isoamyl, prim, cans, wks lb.	...	.32	...	.32	...	.32
drs, lcl, delvd lb.	...	.27	...	.27	...	.27
Isobutyl, ref'd, lcl, drs lb.	...	.10	...	.10	.10	.12
c-l, drs lb.	...	.09½	...	.09½	.09½	.11½
tks lb.	...	.08½	...	.08½	.08½	.10½
Isopropyl, refd, c-l, drs, f.o.b. wks, frt allowed lb.	...	.39½	.39½	.45	.45	.55
Propyl, norm, 50 gal drs gal.	...	.75	...	.75	...	.75
Special Solvent, tks, wks gal.	...	.28	.27	.28	.24	.32
Aldehyde ammonia, 100 gal drs lb.	.80	.82	.80	.82	.80	.82
Alphanaphthol, crude, 300 lb bbls lb.	...	.52	...	.52	.52	.65
Alphanaphthylamine, 350 lb bbls lb.	.32	.34	.32	.34	.32	.34
Alum, ammonia, lump, c-l, bbls, wks 100 lb.	...	3.25	3.00	3.25	...	3.00
delv NY., Phila 100 lb.	...	3.40	3.15	3.40	...	3.15
Granular, c-l, bbls. wks 100 lb.	...	3.00	2.75	3.00	...	2.75
Powd, c-l, bbls, wks 100 lb.	...	3.40	3.15	3.40	...	3.15
Chrome, bbls 100 lb.	6.50	6.75	6.50	7.25	7.00	7.25
Potash, lump, c-l, bbls, wks 100 lb.	...	3.50	3.25	3.50	...	3.25
Granular, c-l, bbls, wks 100 lb.	...	3.25	3.00	3.25	...	3.40
Powd, c-l, bbls, wks 100 lb.	...	3.65	3.40	3.65	...	3.40
Soda, bbls, wks 100 lb.	...	3.25	...	3.25	...	...
Aluminum metal, c-l, NY 100 lb.	...	20.00	19.00	20.00	19.00	20.00
Acetate, CP, 20%, bbls lb.	.09	.10	.09	.10	.09	.10
Chloride anhyd, 99%, wks lb.	.07	.12	.07	.12	.07	.12
93%, wks lb.	.05	.08	.05	.08	.05	.08
Crystals, c-l, drs, wks lb.	.06	.06¼	.06	.06¼	.06	.07
Solution, drs, wks lb.	.02¾	.03¼	.02¾	.03¼	.02¾	.03½
Hydrate, 96%, light, 90 lb bbls, delv lb.	.13	.15	.13	.15	.13	.15
heavy, bbls, wks lb.	.029	.03½	.029	.03½	.029	.04½
Oleate, drs lb.	.16¾	.18½	.16¾	.18½	.15¾	.18½
Palmitate, bbls lb.	.22	.23	.22	.23	.21	.22
Resinate, pp., bbls lb.	...	.15	...	.15	...	.15
Stearate, 100 lb bbls lb.	.19	.21	.19	.21	.18	.21
Sulfate, com, c-l, bgs, wks 100 lb.	...	1.35	...	1.35	...	1.35
c-l, bbls, wks 100 lb.	...	1.55	...	1.55	...	1.55
Sulfate, iron-free, c-l, bgs, wks 100 lb.	...	1.90	...	1.90	...	1.90
c-l, bbls, wks 100 lb.	...	2.05	...	2.05	...	2.05
Aminoazobenzene, 110 lb kgs lb.	...	1.15	...	1.15	...	1.15
Ammonia anhyd com, tks lb.	.04½	.05½	.04½	.05½	.04½	.05½
Ammonia anhyd, 100 lb cyl lb.	.16	.22	.16	.22	.15¼	.22
26°, 800 lb drs, delv lb.	.02¼	.02½	.02¼	.02½	.02¼	.03
Aqua 26°, tks, NH cont.	...	.05	.04½	.05	.04½	.05
tk wagon lb.	...	.02	...	.02	.02	.024
AMMONIUM						
Ammonium Acetate, kgs lb.	.26	.33	.26	.33	.26	.33
Bicarbonate, bbls, f.o.b. wks 100 lb.	5.15	5.71	5.15	5.71	5.15	5.71
Bifluoride, 300 lb bbls lb.	.16	.17	.16	.17	.15	.17
carbonate, tech, 500 lb bbls lb.	.08	.12	.08	.12	.08	.12
Chloride, White, 100 lb bbls, wks 100 lb.	4.45	4.90	4.45	4.90	4.45	4.90
Gray, 250 lb bbls, wks 100 lb.	5.50	6.25	5.00	6.25	5.00	5.75
Lump, 500 lbs cks spot lb.	.10½	.11	.10½	.11	.10½	.11
Lactate, 500 lb bbls lb.	.15	.16	.15	.16	.15	.16
Laurate, bbls lb.	...	.23	...	...	...	...
Linoleate lb.	...	.15	.11	.15	.11	.12
Naphthenate, bbls lb.	...	.17	...	...	...	...
Nitrate, tech, cks lb.	.03¾	.04	.03¾	.04	.04	.05
Oleate, drs lb.	...	.15	.15	.10	...	.10
Oxalate, neut, cryst, powd, bbls lb.	...	.22½	.22½	.23	.26	.27
pure, cryst, bbls, kgs lb.	.27	.28	.27	.28	.27	.28
Perchlorate, kgs lb.	...	.16	...	.16	...	.16
Persulfate, 112 lb kgs lb.	.21	.24	.21	.24	.21	.25
Phosphate, dibasic tech, powd, 325 lb bbls lb.	.07½	.10	.07½	.10	.07½	.10
Ricinoleate, bbls lb.	...	.15	...	...	...	...
Stearate, anhyd, bbls lb.	...	.24	...	...	...	...
Paste, bbls lb.	...	.07½	...	...	...	...
Sulfate, dom, f.o.b., bulk ton	...	28.00	26.00	28.00	22.00	26.00
200 lb bgs ton	...	29.30	...	29.30	...	...
100 lb bgs lb.	...	30.00	...	30.00	...	...
Sulfocyanide, kgs lb.	...	.55	...	.55	...	.55
Amyl Acetate (from pentane) tks, delv lb.	...	.11½	...	.11½	.11½	.13½
tech, drs, delv lb.	.11½	.12	.11½	.13½	.12½	.149
Secondary, tks, delv lb.	...	.08½	...	.08½	...	.108
c-l, drs, delv lb.	...	.09½	...	.09½	.113	.123
Chloride, norm, drs, wks lb.	.56	.68	.56	.68	.56	.68
mixed, drs, wks lb.	.07	.077	.07	.077	.07	.077
tks, wks lb.	...	.06	...	.06	...	.06
Mercaptan, drs, wks lb.	...	1.10	...	1.10	...	1.10
Oleate, lcl, wks, drs lb.	...	.25	...	.25	...	...
Stearate, lcl, wks, drs lb.	...	.26	...	.26	...	...

g Grain alcohol 20c a gal. higher in each case.

	Current Market		1937 Low	1937 High	1936 Low	1936 High
Amylene, drs, wks lb.	.102	.11	.102	.11	.102	.11
tks, wks lb.	...	.09	...	.09	...	.09
Aniline Oil, 960 lb drs and tks lb.	.15	.17½	.15	.17½	.15	.17½
Annatto fine lb.	.34	.37	.34	.37	.34	.37
Anthracene, 80% lb.	...	.75	...	.75	...	.75
40% lb.	...	.18	...	.18	...	.18
Anthraquinone, sublimed, 125 lb bbls lb.	...	.65	.50	.65	.50	.52
ANTIMONY						
Antimony metal slabs, ton lots lb.	...	.17¼	.13⅝	.17¼	.11⅜	.14
Butter of, see Chloride.						
Chloride, soln cbys lb.	...	.17	...	.17	.13	.17
Needle, powd, bbls lb.	.14	.16	.14	.19½	.11	.12½
Oxide, 500 lb bbls lb.	.15½	.16½	.14¼	.16½	.12¾	.14
Salt, 63% to 65%, tins lb.	.23¾	.24	.22	.24	.22	.24
Sulfuret, golden, bbls lb.	.22	.23	.22	.23	.22	.23
Archil, conc, 600 lb bbls lb.	.21	.27	.21	.27	.21	.27
Double, 600 lb bbls lb.	.18	.20	.18	.20	.18	.20
Aroclors, wks lb.	.18	.30	.18	.30	.18	.30
Arrowroot, bbl lb.	.08½	.09	.08½	.09¾	.08¾	.09¾
Arsenic, Metal lb.	.42	.44	.42	.44	.40	.44
Red, 224 lb cs kgs lb.	...	.15¾	...	.15¾	...	.15¾
White, 112 lb kgs lb.	.03	.04	.03	.04	.03	.04½
Barium Carbonate precip, 200 lb bgs, wks ton	52.50	62.50	52.50	62.50	56.50	61.00
Nat (witherite) 90% gr, c-l, wks, bgs ton	...	44.00	42.00	45.00	42.00	45.00
Chlorate, 112 lb kgs, N Y lb.	.16½	.17½	.16½	.17½	.15½	.17½
Chloride, 600 lb bbls, wks ton	72.00	74.00	72.00	74.00	72.00	74.00
Dioxide, 88%, 690 lb drs lb.	.11	.12	.11	.12	.11	.12
Hydrate, 500 lb bbls lb.	.04¾	.05½	.04¾	.05½	.05¼	.06
Nitrate, bbls lb.	.07	.08¼	.07	.08¼	.07	.08¼
Barytes, floated, 350 lb bbls wks ton	...	23.65	23.65	23.65	23.65	23.65
Bauxite, bulk, mines ton	7.00	10.00	7.00	10.00	7.00	10.00
Bentonite, c-l, No. 1, bgs, wks ton	...	16.00	...	16.00	...	16.50
No. 2 ton	...	11.00	...	11.00	...	11.00
Benzaldehyde, tech, 945 lb drs, wks lb.	.60	.62	.60	.62	.60	.62
Benzene (Benzol), 90%, Ind, 8000 gal tks, frt allowed gal.	...	.16	...	.16	.16	.18
90% c-l, drs gal.	...	.21	...	.21	...	.23
Ind pure, tks, frt allowed gal.	...	.16	...	.16	.16	.18
Benzidine Base, dry, 250 lb bbls lb.	.70	.72	.70	.72	.70	.74
Benzoyl Chloride, 500 lb drs lb.	.40	.45	.40	.45	.40	.45
Benzyl Chloride, tech, drs lb.	.30	.40	.30	.40	.30	.40
Beta-Naphthol, 250 lb bbl, wks lb.	.23	.24	.23	.24	.24	.27
Naphthylamine, sublimed, 200 lb bbls lb.	1.25	1.35	1.25	1.35	1.25	1.35
Tech, 200 lb bbls lb.	.51	.52	.51	.52	.51	.55
Bismuth metal lb.	1.00	1.10	1.00	1.10	1.00	1.10
Chloride, boxes lb.	3.20	3.25	3.20	3.25	3.20	3.25
Hydroxide, boxes lb.	3.15	3.20	3.15	3.20	3.15	3.20
Oxychloride, boxes lb.	...	2.95	2.75	3.04	2.95	3.00
Subbenzoate, boxes lb.	3.25	3.30	3.25	3.30	3.25	3.30
Subcarbonate, kgs lb.	1.23	1.58	1.23	1.58	1.40	1.45
Trioxide, powd, boxes lb.	...	3.57	3.45	3.57	3.45	3.50
Subnitrate lb.	1.22	1.48	1.22	1.48	1.30	1.35
Blackstrap, cane (see Molasses, Blackstrap).						
Blanc Fixe, 400 lb bbls, wks ton *h*	40.00	75.00	40.00	75.00	42.50	70.00
Bleaching Powder, 800 lb drs, c-l, wks, contract 100 lb.	...	2.00	...	2.00	...	2.00
lcl, drs, wks lb.	2.25	3.60	2.25	3.60	2.25	3.60
Blood, dried, f.o.b., NY unit	...	3.25	3.25	4.30	2.50	4.25
Chicago, high grade unit	...	3.00	3.00	4.65	2.90	4.50
Imported shipt unit	...	3.25	3.25	4.10	2.60	3.75
Blues, Bronze Chinese Milori Prussian Soluble lb.	.36	.37	.36	.37	.37	.38½
Ultramarine,* dry, wks, bbls lb.	...	.10	...	.10	...	.10
Regular grade, group 1 lb.	...	.15	...	.15	...	.15
Special, group 1 lb.	...	.18	...	.18	...	.18
Pulp, No. 1 lb.	...	.26	...	.26	...	.26
Bone, 4½ + 50% raw, Chicago ton	29.00	30.00	26.00	28.00	20.00	25.00
Bone Ash, 100 lb kgs lb.	.06	.07	.06	.07	.06	.07
Black, 200 lb bbls lb.	.06½	.08¼	.05½	.08¼	.05½	.08¼
Meal, 3% & 50%, imp ton	...	24.00	24.00	27.50	23.00	26.00
Domestic, bgs, Chicago ton	23.00	24.00	19.00	27.00	16.00	20.00
BORAX						
Borax, tech, gran, 80 ton lots, sacks, delv ton *i*	...	42.00	40.00	42.00	...	40.00
bbls, delv ton *i*	...	52.00	50.00	52.00	...	50.00
Tech, powd, 80 ton lots, sacks ton *i*	...	47.00	45.00	47.00	...	45.00
bbls, delv ton *i*	...	57.00	56.00	57.00	...	56.00
Bordeaux Mixture, drs lb.	.11	.11½	.10½	.11	.08	.16

h Lowest price is for pulp, highest for high grade precipitated; *i* Crystals $6 per ton higher; USP, $15 higher in each case; * Freight is equalized in each case with nearest producing point.

	Current Market		1937 Low	1937 High	1936 Low	1936 High
Bromine, cases lb.	.30	.43	.30	.43	.30	.43
Bronze, Al, pwd, 300 lb drs lb.	.90½	.92½	.80	1.50	.80	1.50
Gold, blk lb.	.45	.65	.40	.65	.40	.55
Butanes, com 16-32° group 3 tks lb.	.02¼	.03¾	.02¼	.03¾	...	.04
Butyl, Acetate, norm drs, frt allowed lb.	.10	.10½	.10	.10½	.09½	.12½
tks, frt allowed lb.	...	.09	...	.09	.08½	.11
Secondary, tks, frt allowed lb.	...	.07	.07	.07½	.07½	.096
drs, frt, allowed lb.	.08	.08½	.08	.09	.106	.111
Aldehyde, 50 gal drs, wks lb.	...	.17½	.16½	.17½	.19	.21
Carbinol, norm drs, wks lb.	.60	.75	.60	.75	.60	.75
Lactate lb.	.22½	.23½	.22½	.23½	.22½	.23½
Oleate, drs, frt allowed lb.	...	.25	...	.25	...	...
Propionate, drs lb.	.18	.18½	.18	.18½	.18	.18½
tks, delv lb.	...	.17	...	.17	...	.17
Stearate, 50 gal drs lb.	...	.26	.25	.26	...	.26
Tartrate, drs lb.	.55	.60	.55	.60	.55	.60
Butyraldehyde, drs, lcl, wks lb.	...	.35½	...	.35½	...	...
Cadmium Metal lb.	1.60	nom.	1.05	1.60	.75	1.05
Sulfide, orange, boxes lb.	1.50	1.60	.90	1.60	.90	1.10
CALCIUM						
Calcium, Acetate, 150 lb bgs c-l, delv 100 lb.	...	1.95	1.95	2.25	...	2.10
Arsenate, North and West, dealers, drs lb.	.06¾	.07¼	.06¼	.07¾	.06¼	.07¾
South, dealers, drs lb.	.06½	.07	.06½	.07	.06½	.06¾
Carbide, drs lb.	.05	.06	.05	.06	.05	.06
Carbonate, tech, 100 lb bgs c-l lb.	1.00	1.00	1.00	1.00	1.00	1.00
Chloride, flake, 375 lb drs, c-l, delv ton	...	22.00	...	22.00	...	22.00
Solid, 650 lb drs, c-l, delv ton	...	20.00	...	20.00	...	20.00
Ferrocyanide, 350 lb bbls wks lb.	...	.17	...	.17	...	.17
Gluconate, Pharm, 125 lb bbls lb.	.50	.57	.50	.57	.50	.57
Nitrate, 100 lb bgs ton	...	26.10	...	26.10	...	26.50
Palmitate, bbls lb.	.22	.23	.22	.23	.21	.22
Phosphate, tech, 450 lb bbls lb.	.06½	.07½	.06½	.07½	.07½	.08
Resinate, precip, bbls lb.	.13	.14	.13	.14	.13	.14
Stearate, 100 lb bbls lb.	.19	.21	.19	.21	.18	.21
Camphor, slabs lb.	.55	.56	.54	.56	.50	.56
Powder lb.	.55	.56	.54	.56	.4940	.56
Camwood, Bk, ground bbls lb.	.16	.18	.16	.18	.16	.18
Carbon Bisulfide, 500 lb drs lb.	.05	.05¾	.05	.05¾	.05¼	.08
Black, c-l, bgs, delv, price varying with zone lb.	.0445	.0535	.0445	.0535	.0445	.0535
lcl, bgs, delv, all zones lb.	...	.07	...	.07	...	.07
cartons, delv lb.	...	.07¾	...	.07¾	...	.07¾
cases, delv lb.	...	.08¼	...	.08¼	...	.08¼
Decolorizing, drs, c-l lb.	.08	.15	.08	.15	.08	.15
Dioxide, Liq 20-25 lb cyl lb.	.06	.08	.06	.08	.06	.08
Tetrachloride, 1400 lb drs, delv lb.	.05¼	.06	.05¼	.06	.05¼	.06
Casein, Standard, Dom, grd lb.	.12½	.13	.12½	.20¾	.14½	.20¾
80-100 mesh, c-l, bgs lb.	.13	.13½	.13	.21¼	.15	.21¼
Castor Pomace. 5½ NH_3, c-l, bgs, wks ton	...	21.00	21.00	25.00	15.00	20.00
Imported, ship, bgs ton	...	nom.	...	nom.	17.00	18.00
Celluloid, Scraps, ivory cs lb.	.12	.15	.12	.15	.17	.18
Transparent, cs lb.	.12	.13	.12	.13	...	.20
Cellulose, Acetate, 50 lb kgs lb.	...	.40	.40	.55	.55	.60
Chalk, dropped, 175 lb bbls lb.	.03	.03¾	.03	.03¾	.03	.03¾
Precip, heavy, 560 lb cks lb.	.03	.04	.03	.04	.03	.04
Light, 250 lb cks lb.	.03¼	.04	.03	.04	.03	.04
Charcoal, Hardwood, lump, blk, wks bu.	...	.15	...	.15	...	.15
Softwood, bgs, delv* ton	23.00	34.00	23.00	34.40	23.00	34.00
Willow, powd, 100 lb bbl, wks lb.	.06	.07	.06	.07	.06	.06¼
Chestnut, clarified, tks, wks lb.	...	.02125	.01625	.02125	.01625	.01⅞
25%, bbls, wks lb.	...	.0225	.02	.0225	.01½	.02
Pwd, 60%, 100 lb bgs, wks lb.	...	.04⅞	...	.04⅞	...	.04⅞
China Clay, c-l, blk mines ton	...	6.50	...	6.50	...	7.00
Imported, lump, blk ton	22.00	25.00	22.00	25.00	15.00	25.00
Chlorine, cyls, lcl, wks, contract lb.	.07½	.08½	.07½	.08½	.07½	.08½
cyls, c-l, contract lb. *j*	...	.05½	...	.05½	...	.05½
Liq, tk, wks, contract 100 lb.	...	2.15	...	2.15	...	2.15
Multi, c-l, cyls, wks, cont lb.	2.30	2.55	2.30	2.55	2.30	2.55
Chloroacetophenone, tins, wks lb.	3.00	3.50	3.00	3.50	...	3.00
Chlorobenzene, Mono, 100 lb drs, lcl, wks lb.	.06	.07½	.06	.07½	.06	.07½
Chloroform, tech, 1000 lb drs lb.	.20	.21	.20	.21	.20	.21
USP, 25 lb tins lb.	.30	.31	.30	.31	.30	.31
Chloropicrin; comml cyls lb.	...	.80	...	.80	.85	.90
Chrome, Green, CP lb.	.21	.24	.20	.24	.21½	.23
Yellow lb.	.14½	.15½	.13	.16½	.11	.14
Chromium, Acetate, 8% Chrome, bbls lb.	.05	.08	.05	.08	.06	.08
20° soln, 400 lb bbls lb.	...	.05½	...	.05½	...	.05½
Fluoride, powd, 400 lb bbl lb.	.27	.28	.27	.28	.27	.28

j A delivered price; * Depends upon point of delivery.

Current

Coal Tar
Dinitrotoluene

	Current Market		1937 Low	1937 High	1936 Low	1936 High
Coal tar, bbls ....bbl.	7.50	8.00	6.75	9.00	7.25	9.00
Cobalt Acetate, bbls ......lb.	.66	.68	.58	.68	.58	.60
Carbonate tech, bbls ....lb.	...	1.63	1.42¾	1.63	1.35	1.48
Hydrate, bbls ....lb.	...	1.78	1.60	1.78	1.66	1.76
Linoleate, solid, bbls ...lb.	...	.31	.31	.33	.30	.31¼
Oxide, black, bgs ......lb.	...	1.67	1.41	1.67	1.29	1.49
Resinate, fused, bbls ...lb.	...	.13½	.13	.13½	.12½	.13
Precipitated, bbls .....lb.	.	.34	.30½	.34	...	.32
Cochineal, gray or bk bgs..lb.	.35	.38	.32	.38	.32	.36
Teneriffe silver, bgs .....lb.	.36	.39	.33	.39	.33	.37
Copper, metal, electrol 100 lb.	...	11.75	11.75	16.25	9.50	12.00
Carbonate, 400 lb bbls ..lb.	.10½	.12½	.10½	.12½	...	.08¼
52-54% bbls ....lb.	.16½	.17½	.16¼	.19	.14½	.16¼
Chloride, 250 lb bbls ...lb.	.15	.17	.15	.18	.17	.18
Cyanide, 100 lb drs ....lb.	.37	.38	.37	.38	.37	.38
Oleate, precip, bbls .....lb.	...	.20	...	.20	...	.20
Oxide, black, bbls, wks..lb.	.17½	.18	.17½	.18	.14½	.15¾
red 100 lb bbls ....lb.	...	.19775	.17	.19975	.14	.15
Resinate, precip, bbls ...lb.	.15	.16	.15	.19	.18	.19
Stearate, precip, bbls ...lb.	.23	.24	.23	.40	.35	.40
Sub-acetate verdigris, 400 lb bbls ....lb.	.18	.19	.18	.19	.18	.19
Sulfate, bbls, c-l, wks 100 lb.	...	4.75	4.55	6.00	3.85	4.55
Copperas, crys and sugar bulk c-l, wks ....ton	12.00	13.00	12.00	13.00	13.00	16.00
Corn Sugar, tanners, bbls 100 lb.	3.50	3.60	3.50	4.34	3.08	4.03
Corn Syrup, 42°, bbls..100 lb.	...	3.61	3.61	4.36	3.05	3.95
43°, bbls ....100 lb.	...	3.66	3.66	4.41	3.10	4.05
Cotton, Soluble, wet, 100 lb bbls ....lb.	.40	.42	.40	.42	.40	.42
Cream Tartar, USP, powd & gran, 300 lb bbls ......lb.	.19¾	.20¼	.15	.20¼	.15	.16¾
Creosote, USP, 42 lb cbys lb.	.45	.47	.45	.47	.45	.47
Oil, Grade 1, tks ......gal.	.13½	.14	.13	.14	.12½	.13½
Grade 2 ....gal.	.118	.128	.113	.128	.109	.12
Cresol, USP, drs ....lb.	.12½	.13	.10	.13	.10	.10½
Crotonaldehyde, 98%, drs, wks ....lb.	.26	.30	.26	.30	.26	.30
Cutch, Philippine, 100 lb bale lb.	.04	.04¾	.04	.04¾	.04	.04¾
Cyanamid, bgs, c-l, frt allowed Ammonia unit ...	.	1.15	1.10	1.15	1.07½	1.10
Derris root 5% rotenone, bbls lb.	.39	.47	.39	.47	...	...
Dextrin, corn, 140 lb bgs **f.o.b., Chicago** ...100 lb.	3.95	4.15	3.95	5.00	3.45	5.00
British Gum, bgs ...100 lb.	4.30	4.40	4.30	5.25	3.70	5.40
Potato, Yellow, 220 lb bgs lb.	.07¾	.08¾	.07¾	.08¾	.07¾	.08¾
White, 220 lb bgs, lcl lb.	.08	.09	.08	.09	.08	.09
Tapioca, 200 bgs, lcl ...lb.	...	.08	...	.08	...	.08
White, 140 lb bgs ..100 lb.	4.00	4.20	4.00	4.58	3.40	4.95
Diamylamine, c-l, drs, wks lb.	.47	.75	.47	.75	.75	1.00
Diamylene, drs, wks ......lb.	.095	.102	.095	.102	.095	.102
tks, wks ....lb.	...	.08½	...	.08½	...	.08½
Diamylether, wks, drs ....lb.	.085	.092	.085	.092	.085	.092
tks, wks ....lb.	...	.075	...	.075	...	.075
Oxalate, lcl, drs, wks ..lb.	...	.30	...	.30	...	...
Diamylphthalate, drs, wks lb.	.20½	.21	.19	.21½	.18	.19½
Diamyl Sulfide, drs, wks ..lb.	...	1.10	...	1.10	...	1.10
Dianisidine, bbls ....lb.	2.25	2.45	2.25	2.45	2.25	2.45
Dibutoxy Ethyl Phthalate, drs, wks ....lb.	...	.35	...	.35	...	...
Dibutylamine, lcl, drs, wks lb.	...	.55	...	...	...	...
Dibutyl Ether, drs, wks, lcl lb.	...	.30	...	.30	...	...
Dibutylphthalate, drs, wks, frt allowed ....lb.	...	.21	.19½	.21	.18	.21
Dibutyltartrate, 50 gal drs lb.	.35	.40	.35	.50	.35	.40
Dichlorethylene, drs .....gal.	.29	...	.29	...	.29	...
Dichloroethylether, 50 gal drs, wks ....lb.	.15	.16	.15	.16	.16	.17
tks, wks ....lb.	...	.14	...	.14	...	.15
Dichloromethane, drs, wks lb.	...	.23	...	.23	...	.23
Dichloropentanes, drs, wks lb.	no prices		no prices		.032	.040
tks, wks ....lb.	no prices		no prices		...	.02½
Diethanolamine, tks, wks..lb.	...	.25	.25	.35	...	.30
Diethylamine, 400 lb drs ..lb.	2.75	3.00	2.75	3.00	2.75	3.00
Diethylaniline, 850 lb drs..lb.	.50	.52	.50	.52	.50	.55
Diethyl Carbinol, drs .....lb.	.60	.75	.60	.75	.60	.75
Diethylcarbonate, com drs lb.	.31⅜	.35	.31⅜	.35	.31⅜	.35
90% grade, drs ....lb.	...	.25	...	.25	...	.25
Diethylorthotoluidin, drs ..lb.	.64	.67	.64	.67	.64	.67
Diethylphthalate, 1000 lb drs lb.	.19	.19½	.18	.19½	.18	.19
Diethylsulfate, tech, drs, wks, lcl ....lb.	...	.20	...	.20	...	.20
Diethyleneglycol, drs .....lb.	.22	.23	.16½	.23	.15½	.17½
Mono ethyl ethers, drs..lb.	.16	.17	.16	.17	.15	.17
tks, wks ....lb.	...	.15	...	.15	...	.15
Mono butyl ether, drs ..lb.	...	.26	...	.26	...	.26
Diethylene oxide, 50 gal drs, wks ....lb.	.20	.24	.20	.24	.20	.24
Diglycol Oleate, bbls .....lb.	...	.21	.21	.24	...	.24
Laurate, bbls ....lb.	...	.27½	...	...	...	...
Stearate, bbls ....lb.	...	.27½	...	...	...	...
Dimethylamine, 400 lb drs, pure 25 & 40% sol 100% basis ....lb.	...	1.00	...	.95	...	.95
Dimethylaniline, 340 lb drs lb.	.26	.27	.26	.27	.26	.30
Dimethyl Ethyl Carbinol, drs lb	.60	.75	.60	.75	.60	.75
Dimethyl phthalate, drs, wks, frt allowed ....lb.	.	.21	.20½	.21	.19½	.21½
Dimethysulfate, 100 lb drs lb.	.45	.50	.45	.50	.45	.50
Dinitrobenzene, 400 lb bbls lb. *k*	.16	.19	.16	.19	.16	.19½
Dinitrochlorobenzene, 400 lb bbls ....lb.	.16½	.17½	.16	.17½	.14	.15½
Dinitronaphthalene, 350 lb bbls ....lb.	.35	.38	.35	.38	.34	.37
Dinitrophenol, 350 lb bbls lb.	.23	.24	.23	.24	.23	.24
Dinitrotoluene, 300 lb bbls lb.	.14½	.15½	.14½	.15½	.14½	.16½

k Higher price is for purified material.

Prices

		Current Market		1937 Low	1937 High	1936 Low	1936 High
Diphenyl, bbls	lb.	.15	.25	.15	.25	.15	.25
Diphenylamine	lb.	.31	.32	.31	.32	.31	.32
Diphenylguanidine, 100 lb drs	lb.	.35	.37	.35	.37	.35	.37
Dip Oil, see Tar Acid Oil.							
Divi Divi pods, bgs shipmt	ton	34.00	nom.	34.00	nom.	32.00	45.00
Extract	lb.	.05	.05½	.05	.05½	.05	.05½
EGG YOLK							
Egg Yolk, dom., 200 lb cases	lb.	.68	nom.	.68	nom.	.63	.68
Imported	lb.	.60	nom.	.53	.60	.48	.56
Epsom Salt, tech, 300 lb bbls c-l NY	100 lb.	1.90	2.10	1.80	2.10	1.80	2.00
USP, c-l, bbls	100 lb.	...	2.10	2.00	2.10	...	2.00
Ether, USP anaesthesia 55 lb drs	lb.	.22	.23	.22	.23	.22	.23
(Conc)	lb.	.09	.10	.09	.10	.09	.10
Isopropyl 50 gal drs	lb.	.07	.08	.07	.08	.07	.08
tks, frt allowed	lb.	...	.06	...	.06	...	.06
Nitrous, conc, bottles	lb.	...	.68	.68	.77	.75	.77
Synthetic, wks, drs	lb.	.08	.09	.08	.09	.08	.09
Ethyl Acetate, 85% Ester							
tks, frt alld	lb.	...	.06½	...	.06½	.06½	.08
drs, frt alld	lb.	...	.07½	...	.07½	.07½	.09
95%, tks, frt allowed	lb.	...	.06¾	...	.06¾	.07	.08½
drs, frt alld	lb.	...	.07¾	...	.07¾	.08	.10
Acetoacetate, 110 gal drs	lb.	...	.27½	...	.27½	.37	.68
Benzylaniline, 300 lb drs	lb.	.86	.88	.86	.88	.86	.88
Bromide, tech, drs	lb.	.50	.55	.50	.55	.50	.55
Cellulose, drs, wks, frt allowed	lb.	.70	1.00	...	...	...	...
Chloride, 200 lb drs	lb.	.22	.24	.22	.24	.22	.24
Chlorocarbonate, cbys	lb.	...	.30	...	.30	...	.30
Crotonate, drs	lb.	1.00	1.25	1.00	1.25	1.00	1.25
Formate, drs, frt allowed	lb.	.27	.28	.27	.31	...	...
Lactate, drs, wks	lb.	...	.33	...	.33	.25	.29
Methyl Ketone, 50 gal drs, frt allowed	lb.	.07	.07½	.07	.07½	.07	.09
tks, frt allowed	lb.	...	.06½	...	.06½	.06½	.07½
Oxalate, drs, wks	lb.	.30	.34	.30	.34	.37½	.55
Oxybutyrate, 50 gal drs, wks	lb.	.30	.30½	.30	.30½	.30	.30½
Silicate, drs, wks	lb.	...	.77	...	.77	...	...
Ethylene Dibromide, 60 lb drs	lb.	.65	.70	.65	.70	.65	.70
Chloryhdrin, 40%, 10 gal cbys chloro, cont	lb.	.75	.85	.75	.85	.75	.85
Anhydrous	lb.	...	.75	.	.75	...	.75
Dichloride, 50 gal drs, wks	lb.	.0545	.0994	.0545	.0994	.0545	.0994
Glycol, 50 gal drs, wks	lb.	.17	.21	.17	.21	.17	.21
tks, wks	lb.	...	.16	...	.16	...	.16
Mono Butyl Ether, drs, wks	lb.	.20	.21	.20	.21	.20	.21
tks, wks	lb.	...	.19	...	.19	...	.19
Mono Ethyl Ether, drs, wks	lb.	.16	.17	.16	.17	.16	.17
tks, wks	lb.	...	.15	...	.15	...	.15
Mono Ethyl Ether Acetate, drs, wks	lb.	...	.14	...	.14	.14	.18½
tks, wks	lb.	...	.13	...	.13	.13	.16½
Mono, Methyl Ether, drs wks	lb.	.18	.22	.18	.22	.19	.23
tks, wks	lb.	...	.17	...	.17	...	.18
Oxide, cyl	lb.	.50	.55	.50	.55	.50	.60
Ethylidenaniline	lb.	.45	.47½	.45	.47½	.45	.47½
Feldspar, blk pottery	ton	...	14.50	...	14.50	...	14.50
Powd, blk, wks	ton	14.00	14.50	14.00	14.50	14.00	14.50
Ferric Chloride, tech, crys, 475 lb bbls	lb.	.05	.07½	.05	.07½	.05	.07½
sol, 42° cbys	lb.	.06¼	.06½	.06¼	.06½	.06¼	.06½
Fish Scrap, dried, unground, wks	unit *l*	...	3.50	3.50	4.25	2.50	3.50
Acid, Bulk, 6 & 3%, delv Norfolk & Baltimore basis	unit *m*	...	2.90	3.00	3.15	...	2.25
Fluorspar, 98%, bgs	lb.	no prices		no prices		30.00	35.50
Formaldehyde, USP, 400 lb bbls, wks	lb.	.05¾	.06¼	.05¾	.06¼	.05¾	.07
Fossil Flour	lb.	.02½	.04	.02½	.04	.02½	.04
Fullers Earth, blk, mines	ton	6.50	15.00	6.50	15.00	6.50	15.00
Imp powd, c-l, bgs	ton	23.00	30.00	23.00	30.00	23.00	30.00
Furfural (tech) drs, wks	lb.	.10	.15	.10	.15	.10	.15
Furfuramide (tech) 100 lb drs	lb.	...	.30	...	.30	...	.30
Fusel Oil, 10% impurities	lb.	.16	.18	.16	.18	.16	.18
Fustic, crystals, 100 lb boxes	lb.	.22	.26	.20	.26	.20	.23
Liquid 50°, 600 lb bbls	lb.	.09½	.13	.08½	.13	.08½	.12
Solid, 50 lb boxes	lb.	.17½	.19½	.16	.19½	.16	.18
G SALT PASTE							
G Salt paste, 360 lb bbls	lb.	.45	.47	.45	.47	.45	.47
Gall Extract	lb.	.19	.20	.19	.20	.18	.20
Gambier, com 200 lb bgs	lb.	...	nom.	...	nom.	...	.06
Singapore cubes, 150 lb bgs	100 lb.	...	.10½	.09½	.10½	.08	.09
Gelatin, tech, 100 lb cs	lb.	.50	.55	.50	.55	.50	.55
Glauber's Salt, tech, c-l, bgs, wks*	100 lb.	.95	1.15	.95	1.15	.95	1.30
Anhydrous, see Sodium Sulfate.							
Glue, bone, com grades, c-l bgs	lb.	.14	.17½	.11	.17½	.10½	.17½
Better grades, c-l, bgs	lb.	.15½	.17½	.12½	.17½	.12	.17½
Casein, kgs	lb.	.18	.22	.18	.22	.18	.22

l + 10; *m* + 50; *Bbls. are 20c higher.

	Current Market		1937 Low	1937 High	1936 Low	1936 High
Glycerin, CP, 550 lb drs . . lb.	.21½	.22	.21½	.29	.16	.21½
Dynamite, 100 lb drs . . . lb.	.21½	.22	.21½	.29	.13¾	.21½
Saponification, drs . . . . . lb.	.16	.16½	.15½	.29	.10¼	.22
Soap Lye, drs . . . . lb.	.14½	.15	.14	.27	.09¼	.20
Glyceryl Bori-Borate, bbls lb.	. . .	.40	. . .	. . .	. . .	. . .
Monoricinoleate, bbls . . . lb.	. . .	.27	. . .	. . .	. . .	. . .
Monostearate, bbls . . . . . lb.	. . .	.30	. . .	. . .	. . .	. . .
Oleate, bbls . . . . lb.	. . .	.22	. . .	. . .	. . .	. . .
Phthalate . . . . lb.	. . .	.37	.29	.37	.28	.29
Glyceryl Stearate, bbls . . . lb.	. . .	.18	. . .	.18	. . .	.18
Glycol Bori-Borate, bbls . . lb.	. . .	.26	. . .	. . .	. . .	. . .
Phthalate, drs . . . . lb.	. . .	.40	.29	.40	.29	.35
Stearate, drs . . . . lb.	. . .	.27½	.23	.27½	. . .	.23

GUMS

	Current Market		1937 Low	1937 High	1936 Low	1936 High
Gum Aloes, Barbadoes . . . . lb.	.85	.90	.85	.90	.85	.90
Arabic, amber sorts . . . . . . lb.	.12	.12½	.10½	.15½	.09	.10¾
White sorts, No. 1, bgs . . lb.	.25	.26	.25	.30	.25	.28
No. 2, bgs . . . . lb.	.23	.24	.23	.28	.24	.26
Powd, bbls . . . . lb.	.16	.17	.14	.19	.13	.14
Asphaltum, Barbadoes (Manjak) 200 lb bgs, f.o.b., NY . . . . lb.	.02½	.10½	.02½	.10½	.02½	.10½
California, f.o.b., NY, drs ton	29.00	55.00	29.00	55.00	29.00	55.00
Egyptian, 200 lb cases, f.o.b., NY . . . . lb.	.12	.15	.12	.15	.12	.15
Benzoin Sumatra, USP, 120 lb cases . . . . lb.	.15	.25	.15	.25	.15	.19
Copal, Congo, 112 lb bgs, clean, opaque . . . . lb.	. . .	.19¼	.18⅞	.19¼	.18½	.20
Dark amber . . . . lb.	. . .	.09¼	.06⅞	.09¼	.06⅞	.08
Light amber . . . . lb.	. . .	.14⅜	.10¼	.14⅜	.10¼	.14⅛
Copal, East India, 180 lb bgs						
Macassar pale bold . . . . . lb.	. . .	.13	. . .	.13	.12⅝	.14
Chips . . . . lb.	. .	.05¾	.05¾	.06½	.06⅛	.06½
Dust . . . . lb.	.03⅝	.04⅛	.03⅝	.04⅛	.03⅝	.04⅛
Nubs . . . . lb.	. . .	.10¾	.10¾	.11¼	.10⅜	.11⅛
Singapore, Bold . . . . lb.	. . .	.15⅝	. . .	.15⅝	.15⅛	.16⅞
Chips . . . . lb.	. .	.04¾	.04¼	.05	.04⅜	.05¼
Dust . . . . lb.	.03⅝	.04⅛	.03⅝	.04⅛	.03⅝	.04⅛
Nubs . . . . lb.	. . .	.10⅜	.10⅜	.10¾	.10	.11¼
Copal Manilla, 180-190 lb baskets, Loba A . . . . . lb.	. . .	.12	.09¾	.12	.09¼	.13
Loba B . . . . lb.	. . .	.11⅝	.09¼	.11⅝	.08⅞	.12
Loba C . . . . lb.	. . .	.11¼	.08⅞	.11¼	.08⅜	.11⅛
DBB . . . . lb.	. . .	.08¾	.08	.08¾	.07⅝	.08⅞
Dust . . . . lb.	. . .	.06⅝	.05¾	.06⅝	.05	.06⅛
MA sorts . . . . lb.	. . .	.07¼	.06¾	.07¼	.06¾	.07⅝
Copal Pontianak, 224 lb cases, bold genuine . . . . lb.	. . .	.16½	.15½	.16½	.14¼	.16
Chips . . . . lb.	. . .	.10¼	.09⅛	.11⅛	.07	.08½
Mixed . . . . lb.	. . .	.14	.13½	.14	.13¼	.13¾
Nubs . . . . lb.	. . .	.12⅞	.12¼	.13½	.10¼	.12
Split . . . . lb.	. . .	.14⅝	.13½	.15¼	.12¾	.13
Dammar Batavia, 136 lb cases						
A . . . . lb.	. . .	.25½	.23½	.25½	.21⅜	.22¼
B . . . . lb.	. . .	.24	.22⅛	.24	.20⅜	.21½
C . . . . lb.	. . .	.20⅜	.18½	.20⅜	.16½	.17⅝
D . . . . lb.	. .	.17½	.15¼	.17½	.13⅝	.14⅜
A/D . . . . lb.	. . .	.20⅜	.17⅝	.20⅜	.15½	.17⅛
A/E . . . . lb.	. . .	.17¼	.14⅞	.17¼	.12⅞	.14½
E . . . . lb.	. . .	.08½	.07½	.08½	.06¾	.07⅛
F . . . . lb.	. . .	.07¼	.06¼	.07¼	.05⅞	.06⅞
Singapore, No. 1 . . . . . lb.	. .	.22	.17⅛	.22	.16¼	.17½
No. 2 . . . . lb.	. . .	.16¼	.14⅛	.16¼	.13	.14¼
No. 3 . . . . lb.	. . .	.05¾	.	.05¾	.05¼	.05¾
Chips . . . . lb.	. . .	.13½	.10¼	.13½	.09¾	.09¾
Dust . . . . lb.	. . .	.05¾	.05¾	.06	.04¼	.05⅝
Seeds . . . . lb.	. . .	.09½	.07⅞	.09½	.06⅝	.07⅜
Elemi, cons . . . . lb.	.09⅜	.09½	.09⅜	.10¼	.09¾	.10¼
Ester . . . . lb.	.10	.10½	.10	.12	.07⅝	.10
Gamboge, pipe, **cases** . . . . lb.	.80	nom.	.58	.80	.58	.59
Powd, bbls . . . . lb.	.	.85	.65	.85	.65	.66
Ghatti, sol. bgs . . . . lb.	.11	.15	.11	.15	.11	.15
Karaya, powd, bbls, xxx . . lb.	.27	.30	.24	.30	.24	.25
xx . . . . lb.	.18	.19	.16	.19	.16	.17
No. 1 . . . . lb.	.12	.13	.09½	.13	.09½	.10
No. 2 . . . . lb.	.11	.12	.08½	.12	.08½	.09
Kauri, NY, San Francisco, Brown XXX, cases . . . . lb.	.60	.60½	.60	.60½	.60	.60½
BX . . . . lb.	. . .	.38	.33	.38	.33	.33½
B1 . . . . lb.	. . .	.28	.21	.28	.19	.21
B2 . . . . lb.	. . .	.24	.15½	.26	.14½	.15½
B3 . . . . lb.	. . .	.18½	.12	.18½	.12	.12½
Pale XXX . . . . lb.	. . .	.61	.61	.65½	.65	.65½
No. 1 . . . . lb.	. . .	.41	.40	.41	.40	.40½
No. 2 . . . . lb.	. . .	.24	.22	.24	.22	.22½
No. 3 . . . . lb.	. . .	.17¾	.15	.17¾	.15	.15½
Kino, tins . . . . lb.	2.00	2.10	.70	2.10	.70	.80
Mastic . . . . lb.	.55	.56	.55	.58	.56	.60½
Sandarac, prime quality, 200 lb bgs & 300 lb cks . . . lb.	.25	.26	.25	.35	.19½	.38
Senegal, picked bgs . . . . . . lb.	.27	.29	.20	.29	.20	.21
Sorts . . . . lb.	.13	.13½	.09¾	.15	.09¾	.12½
Thus, bbls . . . . 280 lbs.	13.75	14.00	12.00	14.00	11.00	12.00
Strained . . . . 280 lbs.	. . .	14.00	12.00	14.00	11.00	12.00
Tragacanth, No. 1, cases . . lb.	2.75	3.00	2.40	3.25	1.20	2.50
No. 2 . . . . lb.	2.40	2.75	2.00	2.75	1.10	2.10
No. 3 . . . . lb.	2.35	2.70	1.95	2.70	.95	2.05
No. 4 . . . . lb.	2.30	2.65	1.85	2.65	.85	1.95
No. 5 . . . . lb.	2.25	2.50	1.65	2.50	.75	1.75
Yacca, bgs . . . . lb.	.03½	.04½	.03¼	.04½	.03¼	.03¾
Helium, cyl (200 cu. ft.) cyl.	. .	25.00	. . .	25.00	.	25.00
Hematine crystals, 400 lb bbls lb.	.18	.34	.16	.34	.16	.34
Hemlock, 25%, 600 lb bbls, wks . . . . lb.	.03	.03¼	.03	.03¼	. . .	.02⅞
tks . . . . lb.	. . .	.02¾	. . .	.02¾	. . .	.02½

	Current	Market	1937 Low	1937 High	1936 Low	1936 High
Hexalene, 50 gal drs, wks lb.	...	.30	...	.30	...	.30
Hexane, normal 60-70° C. Group 3, tks gal.	...	.10½	...	.10½	...	.12
Hexamethylenetetramine, powd, drs lb.	.35	.36	.35	.36	.35	.39
Hexyl Acetate, secondary, delv, drs lb.	.13	.13½	.13	.13½	.13	.13½
tks lb.	...	.12	...	.12	...	.11½
Hoof Meal, f.o.b. Chicago unit	...	3.40	3.40	3.75	2.35	3.00
Hydrogen Peroxide, 100 vol, 140 lb cbys lb.	.20	.21	.20	.21	.20	.21
Hydroxyamine Hydrochloride lb.	...	3.15	...	3.15	...	3.15
Hypernic, 51°, 600 lb bbls lb.	.16	.21	.15	.21	.17	.20
INDIGO						
Indigo, Bengal, bbls lb.	...	2.40	...	2.40	...	...
Synthetic, liquid lb.	.16½	.19	.16½	.19	.13	.14
Iodine, Resublimed, kgs lb.	1.50	1.60	1.50	1.60	1.50	1.75
Irish Moss, ord, bales lb.	.11	.12	.11	.12	.09	.10
Bleached, prime, bales lb.	.19	.20	.19	.21	.18	.19
Iron Acetate Liq. 17°, bbls lb.	.03	.04	.03	.04	.03	.04
Chloride see Ferric Chloride.						
Nitrate, coml, bbls 100 lb.	2.32	3.11	2.32	3.25	2.75	3.25
Isobutyl Carbinol (128-132°C) drs, wks lb.	.33	.34	.33	.34	.33	.34
tks, wks lb.	...	.32	...	.32	...	.32
Isopropyl Acetate, tks, frt allowed lb.	...	.06½	...	.06½	.06	.07½
drs, frt allowed lb.	.07½	.08	.07½	.08	.07	.09
Ether, see Ether, isopropyl.						
Keiselguhr, 95 lb bgs, NY, Brown ton	60.00	70.00	60.00	70.00	60.00	70.00
LEAD ACETATE						
Lead Acetate, f.o.b. NY, bbls, White, broken lb.	...	.12	.11½	.13½	.11	.11½
cryst, bbls lb.	...	.12	.11½	.13½	.10½	.11½
gran, bbls lb.	...	.12¾	.12¼	.14¼	.11	.12¼
powd, bbls lb.	...	.12¾	.12¼	.14¼	.11¼	.12¼
Arsenate, East, drs lb.	.13	.13½	.11	.13½	.09	.10
Linoleate, solid, bbls lb.	...	.19	.18	.19	.18	.26½
Metal, c-l, NY 100 lb.	...	5.50	5.50	7.05	4.50	6.00
Nitrate, 500 lb bbls, wks lb.	.11	.11½	.09	.11½	.09	.09½
Oleate, bbls lb.	.18½	.20	.15	.20	.15	.16
Red, dry, 95% Pb_3O_4, delv lb.	...	.08	.08	.0945	.07	.085
97% Pb_3O_4, delv lb.	...	.08¼	.08¼	.09¾	.07¼	.08¾
98% Pb_3O_4, delv lb.	...	.08½	.08½	.10	.07½	.09
Resinate, precip, bbls lb.	...	.16½	.14	.16½	...	.14
Stearate, bbls lb.	.22	.23	.22	.23	.22	23
Titanate, bbls, c-l, f.o.b. wks, frt allowed lb.	...	.12	.10	.12	...	...
White, 500 lb bbls, wks lb.	...	.07½	.07¼	.09	.06½	.07¼
Basic sulfate, 500 lb bbls, wks lb.	...	.07	.06¾	.08¾	.06	.06½
Lime, chemical quicklime, f.o.b., wks, bulk ton	7.00	8.00	6.00	8.00	7.00	7.25
Hydrated, f.o.b., wks ton	8.50	12.00	8.00	12.00	8.50	12.00
Lime Salts, see Calcium Salts.						
Lime sulfur, dealers, tks gal.	...	.11	...	.11	...	.11
drs gal.	.13	.16	.13	.16	.13	.16
Linseed Meal, bgs ton	...	42.00	35.00	42.50	29.00	40.50
Litharge, coml, delv, bbls lb.	...	.08	.07½	.08½	.06	.075
Lithopone, dom, ordinary, delv, bgs lb.	.04⅜	.04⅝	.04¼	.04⅝	.04¼	.04¾
bbls lb.	.04⅝	.04⅞	.04½	.04⅞	.04½	.05
High strength, bgs lb.	.05⅞	.06⅛	.05¾	.06⅛	.05¾	.06¼
bbls lb.	.06⅛	.06⅜	.06	.06⅜	.06	.06½
Titanated, bgs lb.	.05⅞	.06⅛	.05¾	.06⅛	.05¾	.06¼
bbls lb.	.06⅛	.06⅜	.06	.06⅜	.06	.06½
Logwood, 51°, 600 lb bbls lb.	.09½	.11½	.08½	.11½	.06½	.10½
Solid, 50 lb boxes lb.	.15	.19	.15	.17½	.13½	.17½
Sticks ton	24.00	25.00	24.00	25.00	24.00	26.00
MADDER						
Madder, Dutch lb.	.22	.25	.22	.25	.22	.25
Magnesite, calc, 500 lb bbl ton	60.00	65.00	60.00	65.00	60.00	65.00
Magnesium Carb, tech, 70 lb bgs, wks lb.	.06¼	.07	.06	.07	.06	.06½
Chloride flake, 375 lb drs, c-l, wks ton	39.00	42.00	39.00	42.00	36.00	42.00
Fluosilicate, crys, 400 lb bbls, wks lb.	.10	.10½	.10	.10½	.10	.10½
Oxide, USP, light, 100 lb bbls lb.	.36	.40	.36	.40	...	.42
Heavy, 250 lb bbls lb.	...	.50	...	.50	...	.50
Palmitate, bbls lb.	.33	nom.	.33	nom.	.23	.24
Silicofluoride, bbls lb.	.09½	.10½	.09½	.10½	...	...
Stearate, bbls lb.	.21	.24	.21	.24	.20	.24
Manganese acetate, drs lb.	...	.26½	.25½	.26½	...	...
Borate, 30%, 200 lb bbls lb.	.15	.16	.15	.16	.15	.16
Chloride, 600 lb cks lb.	.09	.12	.09	.12	.09	.12
Dioxide, tech (peroxide), paper bgs, c-l ton	...	62.50	47.50	62.50	...	47.50
Hydrate, bbls lb.	...	.32	...	.32	...	...
Linoleate, liq, drs lb.	.18	.19¼	.18	.19¼	...	...
solid, precip, bbls lb.	...	.19	.17½	.19	...	...
Resinate, fused, bbls lb.	.08¼	.08½	.08¼	.08½	...	...
precip, drs lb.	...	.12	...	.12	...	...
Sulfate, tech, anhyd, 90-95%, 550 lb drs lb.	.07	.07½	.07	.07½	...	...
Mangrove, 55%, 400 lb bbls lb.	...	.04	...	.04	...	.04
Bark, African ton	26.50	27.00	25.00	27.00	25.50	27.00

Current

Mannitol
Orthodichlorobenzene

	Current Market	1937 Low	1937 High	1936 Low	1936 High
Mannitol, pure cryst, cs, wks lb.	...	1.45	1.45	1.48	1:48	1.60
Marble Flour, blk ....ton	12.00	13.00	12.00	13.00	12.00	13.00
Mercury chloride (Calomel) lb.	1.59	1.60	1.05	1.60	.81	1.20
Mercury metal ...76 lb. flasks	85.00	87.00	85.00	99.00	73.50	95.00
Meta-nitro-aniline ....lb.	.67	.69	.67	.69	.67	.69
Meta-nitro-paratoluidine 200 lb bbls ....lb.	1.45	1.55	1.45	1.55	1.40	1.55
Meta-phenylene-diamine 300 lb bbls ....lb.	.80	.84	.80	.84	.80	.84
Meta-toluene-diamine, 300 lb bbls ....lb.	.65	.67	.65	.67	.65	.69
Methanol, denat, grd, drs, c-l, frt all'd ....gal.	...	.44	.44	.53	...	...
tanks, frt all'd ......gal.	...	.38	.38	.48	...	...
Pure, drs, c-l, frt all'd gal.	...	.38	...	.38	...	...
tanks ....gal.	...	.33	...	.33	...	...
95%, tks ....gal.	...	.31	...	.31	...	...
97%, tks ....gal.	...	.32	...	.32	...	...
Methyl Acetate, dom, 98-100%, drs ....lb.	.16	.17½	.16	.17½	.11	.18½
Acetone, frt all'd, drs gal. *p*	.36	.42	.36	.58½	.45½	.68½
tks, frt allowed, drs gal. *p*	.30	.34	.30	.44½	.41	.48
Synthetic, frt all'd, east of Rock M., drs ....gal. *p*	.42	.51	.42	.59½	.52½	.60
tks, frt all'd ....gal.	.36	.39½	.36	.49½	.48	.53
West of Rocky M., frt all'd, drs ..gal. *p*	...	.46	.46	.58	.55½	.69
tks, frt all'd ..gal. *p*	...	.39½	.39½	.51	.51	.63½
Anthraquinone ....lb.	.65	.67	.65	.67	.65	.67
Butyl Ketone, tks ......lb.	...	.10½	...	.10½	...	.10½
Chloride, 90 lb cyl .....lb.	.32	.40	.32	.43	...	.45
Ethyl Ketone, tks ......lb.	...	.07½	...	.07½	...	.07½
Formate, drs, frt allowed lb.	.35	.36	.35	.39	...	...
Hexyl Ketone, pure, drs lb.	...	.60	...	.60	...	.60
Lactate, drs, frt allowed lb.	...	.30	...	.30	...	...
Propyl carbinol, drs ....lb.	.60	.75	.60	.75	.60	.75
Mica, dry grd, bgs, wks ..lb.	35.00	...	35.00	...	35.00	...
Michler's Ketone, kgs ....lb.	...	2.50	...	2.50	...	2.50
Molasses, blackstrap, tks, f.o.b. NY ....gal.	...	.07	.07	.07¼	.07	.08¼
Monoamylamine, c-l, drs, wks lb.	.52	1.00	.52	1.00	...	1.00
Monobutylamine, lcl, drs, wks ....lb.	...	.65	...	...	...	...
Monochlorobenzene, see Chlorobenzene, mono.						
Monoethanolamine, tks, wks lb.	...	.25	.25	.30	...	.30
Monomethylamine, drs, frt all'd, E. Mississippi, c-l ..lb.	...	.65	...	.65	...	...
Monomethylparaminosulfate, 100 lb drs ....lb.	3.75	4.00	3.75	4.00	3.75	4.00
Myrobalans 25%, liq bbls..lb.	...	.04¼	...	.04¼	...	.04¼
50% Solid, 50 lb boxes lb.	.06	.06¼	.06	.06¼	.06	.06¼
J1 bgs ....ton	...	30.00	26.50	30.00	22.00	26.50
J2 bgs ....ton	...	22.50	19.00	22.50	14.25	16.75
R2 bgs ....ton	...	22.00	18.75	22.00	14.00	16.25
NAPHTHA						
Naphtha, v.m.&p. (deodorized) see petroleum solvents.						
Naphtha, Solvent, water-white, tks ....gal.	...	.31	...	.31	...	.31
drs, c-l ....gal.	...	.36	...	.36	...	.36
NAPHTHALENE						
Naphthalene, dom, crude, bgs, wks ....lb.	...	2.50	2.00	3.00	2.75	4.50
Imported, cif, bgs ....lb.	...	2.25	2.25	3.00	...	...
Balls, flakes, pks ......lb.	...	.08	...	.08	.07¼	.08
Balls, ref'd, bbls, wks ..lb.	...	.07¼	...	.07¼	.06¾	.07¼
Flakes, ref'd, bbls, wks..lb.	...	.07¼	...	.07¼	.06¾	.07¼
Nickel Carbonate, bbls....lb.	.36	.37½	.36	.37½	...	.36
Chloride, bbls ....lb.	.18	.20	.18	.20	.18	.19
Metal ingot ....lb.	...	.35	...	.35	...	.35
Oxide, 100 lb kgs, NY..lb.	.35	.37	.35	.37	.35	.37
Salt, 400 lb bbls, NY ...lb.	.13	.13½	.13	.13½	.13	.13½
Single, 400 lb bbls, NY lb.	.13	.13½	.13	.13½	.13	.13½
Nicotine, 40%, drs, sulfate, 55 lb drs ....lb.	...	.76	...	.76	.75	1.17
Nitre Cake, blk ....ton	...	16.00	...	16.00	12.00	14.00
Nitrobenzene, redistilled, 1000 lb drs, wks ....lb.	.08	.10	.08	.10	.08	.11
tks ....lb.	...	.07½	...	.07½	...	.08½
Nitrocellulose, c-l-l c-l, wks lb.	.22	.29	.26	.29	.26	.34
Nitrogenous Mat'l, bgs, imp unit	...	2.75	2.75	3.55	2.00	3.10
dom, Eastern wks ....unit	...	3.00	2.90	4.25	1.90	3.00
dom, Western wks ....unit	...	2.25	2.25	3.75	1.85	2.75
Nitronaphthalene, 550 lb bbls lb.	.24	.25	.24	.25	.24	.25
Nutgalls Alleppo, bgs .....lb.	no prices		.20	.22	.16	.18
Chinese, bgs ....lb.	no prices		.20	.22	.19	.20
OAK BARK						
Oak Bark Extract, 25%, bbls lb.	...	.03½	...	.03½	...	.03½
tks ....lb.	...	.02¾	...	.02¾	...	.02¾
Octyl Acetate, tks, wks ...lb.	.16	.17	.16	.17	...	.15
Orange-Mineral, 1100 lb cks NY ....lb.	...	.11½	.11¼	.12¾	.10	.11¼
Orthoaminophenol, 50 lb kgs.lb.	2.15	2.25	2.15	2.25	2.15	2.25
Orthoanisidine, 100 lb drs lb.	.70	.74	.70	.74	.82	.84
Orthochlorophenol, drs ....lb.	.35	.75	.35	.75	.50	.65
Orthocresol, drs, wks .....lb.	.13½	.14½	.13½	.14½	.13	.15
Orthodichlorobenzene, 1000 lb drs ....lb.	.06	.07	.05	.07	.05	.11½

o Country is divided in 4 zones, prices varying by zone; *p* Country is divided into 4 zones. Also see footnote directly above; *q* Naphthalene quoted on Pacific Coast F.A.S. Phila. or N. Y.

	Current Market		1937 Low	1937 High	1936 Low	1936 High
Orthonitrochlorobenzene, 1200 lb drs, wks . . . lb.	.28	.29	.28	.29	.28	.29
Orthonitroparachlorphenol, tins . . . lb.	.70	.75	.70	.75	.70	.75
Orthonitrophenol, 350 lb drs . . . lb.	.85	.90	.85	.90	.52	.80
Orthonitrotoluene, 1000 lb drs, wks . . . lb.	.07	.10	.07	.10	.07	.10
Orthotoluidine, 350 lb bbls, l-c-l . . . lb.	.16	.17	.14	.17	.14	.15
Osage Orange, cryst, bbls . . lb.	.17	.25	.17	.25	.17	.25
51° liquid . . . lb.	.07	.08	.07	.08	.07	.07¼
Paraffin, rfd, 200 lb cs slabs						
122-127° M P . . . lb.	.0445	.04½	.0445	.04½	.0445	.04½
128-132° M P . . . lb.	.04¾	.049	.04¾	.049	.04¾	.049
133-137° M P . . . lb.	.05½	.05¾	.05½	.05¾	.05½	.05¾
Para aldehyde, 110-55 gal drs . . . lb.	.16	.18	.16	.18	.16	.18
Aminoacetanilid, 100 lb kgs . . . lb.	. . .	.85	. . .	.85	. . .	.85
Aminohydrochloride, 100 lb kgs . . . lb.	1.25	1.30	1.25	1.30	1.25	1.30
Aminophenol, 100 lb kgs lb.	. . .	1.05	. . .	1.05	. . .	1.05
Chlorophenol, drs . . . lb.	.30	.45	.30	.45	.50	.65
Dichlorobenzene, 200 lb drs, wks . . . lb.	.16	.18	.16	.20	.16	.20
Formaldehyde, drs, wks . . lb.	.34	.35	.34	.35	.34	.39
Nitroacetanilid, 300 lb bbls . . . lb.	.45	.52	.45	.52	.45	.52
Nitroaniline, 300 lb bbls, wks . . . lb.	.45	.47	.45	.47	.47	.51
Nitrochlorobenzene, 1200 lb drs, wks . . . lb.	.23½	.24	.23½	.24	.23½	.24
Nitro-orthotoluidine, 300 lb bbls . . . lb.	2.75	2.85	2.75	2.85	2.75	2.85
Nitrophenol, 185 lb bbls lb.	.35	.37	.35	.37	.45	.50
Nitrosodimethylaniline, 120 lb bbls . . . lb.	.92	.94	.92	.94	.92	.94
Nitrotoluene, 350 lb bbls lb.	. . .	.35	. . .	.35	.36	.37
Para Tertiary amyl phenol, wks, drs, c-l . . . lb.	. . .	.26	. . .	.26	.26	.50
Phenylenedamine, 350 lb bbls . . . lb.	1.25	1.30	1.25	1.30	1.25	1.30
Toluenesulfonamide, 175 lb bbls . . . lb.	.70	.75	.70	.75	.70	.75
tks, wks . . . lb.	. . .	.31	. . .	.31	. . .	.31
Toluenesulfonchloride, 410 lb bbls, wks . . . lb.	.20	.22	.20	.22	.20	.22
Toluidine, 350 lb bbls, wks . . . lb.	.56	.58	.56	.58	.56	.60
Paris Green, dealers, drs . . lb.	.25½	.26½	.22	.26½	. . .	.24
Pentane, normal, 28-38° C, group 3, tks . . . gal.	. . .	.08½	.08½	.09½	.09	.09½
drs, group 3 . . . gal.	.14	.16	.12½	.16	.10	.16
Perchlorethylene, 100 lb drs, frt allowed . . . lb.	. . .	.10½	. . .	.10½	.10½	.15
Petrolatum, dark amber, bbls . . . lb.	.02⅞	.03	.02⅝	.03	.02⅝	.02⅞
Light, bbls . . . lb.	.03⅛	.03⅜	.03⅛	.03⅜	.03⅛	.03⅜
Medium, bbls . . . lb.	.02⅞	.03⅛	.02⅞	.03⅛	.02⅞	.03⅛
Dark green, bbls . . . lb.	.02½	.02¾	.02½	.02¾	.02½	.02¾
Red, bbls . . . lb.	.02⅝	.03¾	.02⅛	.03¾	.02⅛	.02⅝
White, lily, bbls . . . lb.	.06	.06¼	.06	.06¼	.06	.06¼
White, snow, bbls . . . lb.	.07	.07¼	.07	.07¼	.07	.07¼
Petroleum Ether, 30-60°, group, 3 tks . . . gal.	. . .	.13	. . .	.13	. . .	.13
drs, group 3 . . . gal.	.14	.17	.15	.17	.15	.16

PETROLEUM SOLVENTS AND DILUENTS

Cleaners naphthas, group 3, tks, wks . . . gal.	.06⅞	.07⅞	.06⅞	.07⅞	.07⅜	.07½
Bayonne, tks, wks . . gal.	. . .	.10	.09½	.10	.09	.09½
Hydrogenated, naphthas, frt allowed East, tks . . . gal.	. . .	.16	. . .	.16	.15	.16
No. 2, tks . . . gal.	. . .	.18	. . .	.18	. . .	.18
No. 3, tks . . . gal.	. . .	.16	. . .	.16	. . .	.15
No. 4, tks . . . gal.	. . .	.18	. . .	.18	. . .	.18
Lacquer diluents, tks						
Bayonne . . . gal.	.12	.12½	.12	.12½	.12	.12½
Group 3, tks . . . gal.	.07⅞	.08⅞	.07⅞	.08⅞	.07⅞	.08½
Naphtha, V.M.P., East, tks, wks . . . gal.	. . .	.11	.10	.11	.09	.10
Group 3, tks, wks . . . gal.	.06⅞	.07⅞	.06⅞	.07⅞	.07⅜	.07½
Petroleum thinner, East, tks, wks . . . gal.	. . .	.09½	.09	.10	.09	.09½
Group 3, tks, wks . . . gal.	.05⅞	.06⅞	.05⅞	.06⅞	.06⅜	.06⅝
Rubber Solvents, stand grd, East, tks, wks . . . gal.	. . .	.10	.09½	.10	.09	.09½
Group 3, tks, wks . . . gal.	.06⅞	.07⅞	.06⅞	.07⅞	.07⅜	.07½
Stoddard Solvent, East, tks, wks . . . gal.	. . .	.10	.09½	.10	.09	.09½
Group 3, tks, wks . . . gal.	.06⅜	.07⅜	.06⅜	.07⅜	.06⅞	.07
Phenol, 250-100 lb drs . . . lb.	.14½	.15½	.13¼	.15½	.13¼	.15
tks, wks . . . lb.	. . .	.13½	.12¾	.13½	. . .	. . .
Phenyl-Alpha-Naphthylamine, 100 lb kgs . . . lb.	. . .	1.35	. . .	1.35	. . .	1.35
Phenyl Chloride, drs . . . lb.	. . .	.17	.16	.17	. . .	.16
Phenylhydrazine Hydrochloride, com . . . lb.	2.30	6.50	2.30	6.50	2.90	3.00
Phloroglucinol, tech, tins . . lb.	15.00	16.50	15.00	16.50	15.00	16.50
CP, tins . . . lb.	20.00	22.00	20.00	22.00	20.00	22.00

	Current	Market	1937 Low	1937 High	1936 Low	1936 High
Phosphate Rock, f.o.b. mines						
Florida Pebble, 68% basis ton	...	1.85	...	1.85	...	1.85
70% basis ... ton	...	2.35	...	2.35	...	2.35
72% basis ... ton	...	2.85	...	2.85	...	2.85
75-74% basis ... ton	...	3.85	...	3.85	...	3.85
75% basis ... ton	...	5.50	...	5.50	...	4.35
Tennessee, 72% basis .. ton	...	4.50	...	4.50	...	4.50
Phosphorus Oxychloride 175 lb cyl ... lb.	.16	.20	.16	.20	.16	.20
Red, 110 lb cases ... lb.	.40	.44	.40	.44	.40	.45
Sesquisulfide, 100 lb cs .. lb.	.38	.44	.38	.44	.38	.44
Trichloride, cyl ... lb.	.15	.18	.15	.20	.16	.20
Yellow, 110 lb cs, wks .. lb.	.24	.30	.24	.33	.28	.33
Phthalic Anhydride, 100 lb drs, wks ... lb.	.14½	nom.	.14½	.15½	.14½	.15½
Pine Oil, 55 gal drs or bbls						
Destructive dist ... lb.	.52	.55	.49	.65	.44	.50
Steam dist wat wh bbls gal.	...	.69	.64	.79	.64	.65
tks ... gal.	...	.64	.59	.74	...	.59
Pitch Hardwood, wks ... ton	18.25	18.75	15.00	18.75	...	15.00
Coaltar, bbls, wks ... ton	...	19.00		19.00	...	19.00
Burgundy, dom, bbls, wks lb.	.05½	.06½	.03½	.06½	...	.03½
Imported ... lb.	.11½	.12½	.11	.13	.11	.13
Petroleum, see Asphaltum in Gums' Section.						
Pine, bbls ... bbl.	6.00	6.50	6.00	6.50	4.00	5.25
Stearin, drs ... lb.	.03	.04½	.03	.04½	.03	.04½
Platinum, ref'd ... oz.	47.00	56.00	45.00	68.00	34.50	64.00

POTASH

	Current	Market	1937 Low	1937 High	1936 Low	1936 High
Potash, Caustic, wks, sol .. lb.	.06¼	.06½	.06¼	.06½	.06¼	.06½
flake ... lb.	.07	.07⅛	.07	.07⅛	.07	.07⅛
Liquid, tks ... lb.	...	.02⅞	...	.02⅞	...	.02⅞
Manure Salts, imported 30% basis, blk ... unit	...	.58½	.55	.58½	...	...
Potassium Abietate, bbls .. lb.	...	.13	...	...	...	...
Acetate ... lb.	.26	.28	.26	.28	.26	.28
Bicarbonate, USP, 320 lb bbls ... lb.	.09	.18	.09	.18	.09	.18
Bichromate Crystals, 725 lb cks* ... lb.	.08½	.09	.08½	.09	.08½	.09
Binoxalate, 300 lb bbls .. lb.	...	.23	...	.23	...	.23
Bisulfate, 100 lb kgs ... lb.	.15½	.18	.15½	.18	.15½	.18
Carbonate, 80-85% calc 800 lb cks ... lb.	.06½	.07	.06½	.07	.06½	.07½
liquid, tks ... lb.	...	.02¾	...	.02¾	.02¾	.02⅞
drs, wks ... lb.	.02⅞	.03½	.02⅞	.03½	.02⅞	.03¼
Chlorate crys, 112 lb kgs, wks ... lb.	.09¼	.09½	.09¼	.09½	.09¼	.09½
gran, kgs ... lb.	.12	.13	.12	.13	.12	.13
powd, kgs ... lb.	.08½	.08¾	.08½	.08¾	.08	.08¼
Chloride, crys, bbls ... lb.	.04	.04¾	.04	.04¾	.04	.04¾
Chromate, kgs ... lb.	.28	.29	.28	.29	.23	.28
Cyanide, 110 lb cases .. lb.	.55	.57½	.55	.57½	.55	.57½
Iodide, 75 lb bbls ... lb.	.93	1.00	.93	1.15	1.10	1.25
Metabisulfite, 300 lb bbls lb.	.11	.12	.11	.15	.13¾	.15
Muriate, bgs, dom, blk unit	...	.53½	.50	.53½	.45	.50
Oxalate, bbls ... lb.	.25	.26	.25	.26	.25	.26
Perchlorate, kgs, wks ... lb.	.09	.11	.09	.11	.09	.11
Permanganate, USP, crys, 500 & 1000 lb drs, wks lb.	.18½	.19½	.18½	.19½	.18½	.19½
Prussiate, red, bbls ... lb.	.35	.37	.35	.37	.35	.38½
Yellow, bbls ... lb.	.15	.16	.15	.18	.16	.19
Sulfate, 90% basis, bgs ton	...	36.25	...	36.25	33.75	36.25
Titanium Oxalate, 200 lb bbls ... lb.	.33	.35	.33	.35	.32	.35
Pot & Mag Sulfate, 48% basis bgs ... ton	...	25.75	24.75	25.75	22.25	24.75
Propane, group 3, tks ... lb.	.03	.04⅛	.03	.04⅛	.03	.04⅛
Putty, coml, tubs ... 100 lb.	...	2.90	2.90	3.00	2.75	3.00
Linseed Oil, kgs ... 100 lb.	...	4.65	4.65	4.75	4.50	4.75
Pyrethrum, conc liq:						
2.4% pyretherins, drs, frt allowed ... gal.	5.00	5.25	4.15	5.25	...	...
3.6% pyretherins, drs, frt allowed ... gal.	7.75	7.85	6.10	7.85	...	...
Flowers, coarse, Japan, bgs ... lb.	...	.18	.12¾	.18	...	...
Fine powd, bbls ... lb.	...	.19	.14	.19	...	...
Pyridine, denat, 50 gal drs gal.	...	1.55	1.30	1.55	...	1.30
Pyrites, Spanish cif Atlantic ports, blk ... unit	.12	.13	.12	.13	.12	.13
Pyrocatechin, CP, drs, tins lb.	2.15	2.75	2.15	2.75	2.15	2.75
Quebracho, 35% liq tks ... lb.	...	.03	.02⅞	.03	.02⅝	.02⅞
450 lb bbls, c-l ... lb.	...	.03½	.03½	.03⅞	.03⅝	.03⅞
Solid, 63%, 100 lb bales cif ... lb.	...	.04	.03⅞	.04	.03⅝	.03⅞
Clarified, 64%, bales .. lb.	...	.04¼	.04¼	.04⅜	.03⅞	.04⅜
Quercitron, 51 deg liq, 450 lb bbls ... lb.	.06	.06½	.06	.06½	.06	.06½
Solid, drs ... lb.	.10	.12	.10	.12	.10	.12

R SALT

	Current	Market	1937 Low	1937 High	1936 Low	1936 High
R Salt, 250 lb bbls, wks .. lb.	.52	.55	.52	.55	.52	.57
Resorcinol tech, cans ... lb.	.75	.80	.75	.80	.75	.80
Rochelle Salt, cryst ... lb.	.15	.15½	.14½	.15½	.14	.15
Powd, bbls ... lb.	.16	.16½	.13½	.16½	.13	.14
Rosin Oil, bbls, first run gal.	.56	.80	.56	.73	.38	.71
Second run ... gal.	.58	.60	.58	.75	.43	.73
Third run, drs ... gal.	.62	.64	.62	.79	.49	.77

* Spot price is ⅛c higher.

Prices

	Current Market		1937 Low	1937 High	1936 Low	1936 High
Rosins 600 lb bbls, 280 lb unit ex. yard NY:†						
B	...	7.50	7.50	10.00	4.45	10.95
D	...	7.50	7.50	10.35	4.95	10.95
E	...	7.75	7.75	10.25	5.15	10.95
F	...	7.75	7.75	10.80	5.40	10.95
G	...	7.75	7.75	10.85	5.50	10.95
H	...	7.85	7.85	10.85	5.60	10.95
I	...	7.85	7.85	10.90	5.70	10.95
K	...	7.85	7.85	10.90	5.55	10.95
M	...	7.85	7.85	11.00	5.60	10.95
N	...	7.90	7.90	11.05	5.70	11.00
WG	...	8.10	8.10	11.75	5.85	11.00
WW	...	8.25	8.25	13.75	5.90	12.05
Rosins, Gum, Savannah (280 lb unit):†						
B	...	6.25	6.25	8.75	3.15	9.70
D	...	6.25	6.25	9.00	3.75	9.70
E	...	6.25	6.25	9.10	3.90	9.70
F	...	7.25	7.25	9.55	4.10	9.70
G	...	7.25	7.25	9.60	4.20	9.70
H	...	7.25	7.25	9.60	4.30	9.70
I	...	7.25	7.25	9.65	4.35	9.70
K	...	7.25	7.25	9.65	4.30	9.70
M	...	7.25	7.25	9.75	4.35	9.70
N	...	7.25	7.25	9.75	4.45	9.75
WG	...	7.25	7.25	10.50	4.45	9.75
WW	...	7.25	7.25	12.50	4.55	10.80
X	...	7.25	7.25	12.50	4.55	10.80
Rosin, Wood, c-l, FF grade, NY	8.20	9.15	8.20	10.72	6.10	10.52
Rotten Stone, bgs mines ... ton	...	35.00	...	35.00	.	35.00
Imported, lump, bbls ... lb.	...	.12	...	...	...	.
Powdered, bbls ... lb.	.08½	.10	...	...	...	...
SAGO FLOUR						
Sago Flour, 150 lb bgs ... lb.	.03¼	.03¾	.02¾	.03¾	.02¾	.03¾
Sal Soda, bbls, wks ... 100 lb.	...	1.15	...	1.15	1.15	1.30
Salt Cake, 94-96%, c-l, wks ton	19.00	23.00	19.00	23.00	19.00	23.00
Chrome, c-l, wks ... ton	11.00	12.00	11.00	12.00	11.00	13.00
Saltpetre, gran, 450-500 lb bbls ... lb.	.06	.064	.06	.064	.059	.06¼
Cryst, bbls ... lb.	.07	.074	.07	.074	.069	.08
Powd, bbls ... lb.	.07	.074	.07	.074	.069	.07⅛
Satin, White, 550 lb bbls .. lb.	...	.01½	...	.01½	...	.01½
Schaeffer's Salt, kgs ... lb.	.46	.48	.46	.48	.46	.50
Shellac, Bone dry, bbls .. lb. r	.17½	.18	.17½	.22	.17½	.26½
Garnet, bgs ... lb.	.14	.15	.14	.17	.16	.20
Superfine, bgs ... lb. s	.13	.13½	.13	.18½	.14½	.18½
T. N., bgs ... lb. s	.12	.12½	.12	.14½	.13½	.16
Silver Nitrate, vials ... oz.	.32⅝	.34⅞	.32⅝	.35½	.32 5/16	.34⅞
Slate Flour, bgs, wks ... ton	9.00	10.00	9.00	10.00	9.00	10.00
Soda Ash, 58% dense, bgs, c-l, wks ... 100 lb.	...	1.25	...	1.25	...	1.25
58% light, bgs ... 100 lb.	...	1.23	...	1.23	...	1.23
blk ... 100 lb.	...	1.05	...	1.05	...	1.05
paper bgs ... 100 lb.	...	1.20	...	1.20	...	1.20
bbls ... 100 lb.	...	1.50	...	1.50	...	1.50
Caustic, 76% grnd & flake, drs ... 100 lb.	...	3.00	...	3.00	...	3.00
76% solid, drs ... 100 lb.	...	2.60	...	2.60	...	2.60
Liquid sellers, tks .. 100 lb.	...	2.25	...	2.25	...	2.25
Sodium Abietate, drs ... lb.	...	.13	.08	.13	...	.08
Acetate, tech, 450 lb bbls, wks ... lb.	.04¼	.05	.04¼	.05	.04½	.05
Alignate, drs ... lb.	...	.69	.64	.69	...	.64
Antimoniate, bbls ... lb.	.14¾	.15¼	.13¾	.16¼	.12	.14
Arsenate, drs ... lb.	.08	.08½	.08	.11½	...	.10½
Arsenite, liq, drs ... gal.	.30	.33	.33	.40	.40	.75
Dry, gray, drs, wks .. lb.	.07½	.09½	...	...	...	...
Benzoate, USP, kgs ... lb.	.46	.48	.46	.48	.46	.48
Bicarb, 400 lb bbl, wks 100 lb.	...	1.75	...	1.75	1.75	1.85
Bichromate, 500 lb cks, wks* ... lb.	.06½	.07	.06½	.07	.06½	.07
Bisulfite, 500 lb bbl, wks lb.	.03¼	.036	.03¼	.036	.03¼	.036
35-40% sol bbls, wks 100 lb.	1.40	1.80	...	...	...	...
Chlorate, bgs, wks ... lb.	.06¼	.07½	.06¼	.07½	.06¼	.07½
Cyanide, 96-98%, 100 &						
White, drs ... lb.	.09	.13	...	...	...	...
250 lb drs, wks ... lb.	.16½	.17½	.15½	.17½	.15½	.17½
Fluoride, 90%, 300 lb bbls, wks ... lb.	.07½	.08¼	.07½	.08¼	.07¼	.08¼
Hydrosulfite, 200 lb bbls, f.o.b. wks ... lb.	.16	.17	.16	.17	.17	.19
Hyposulfite, tech, pea crys 375 lb bbls, wks 100 lb.	2.50	3.00	2.50	3.00	2.50	3.00
Tech, reg cryst, 375 lb bbls, wks ... 100 lb.	2.40	2.75	2.40	2.75	2.40	2.75
Iodide ... lb.	1.90	1.95	1.90	1.95	1.90	2.05
Metal, drs, 280 lbs ... lb.	...	.19	...	.19	...	...
Metanilate, 150 lb bbls .. lb.	.41	.42	.41	.42	.41	.42
Metasilicate, gran, c-l, wks ... 100 lb.	...	2.15	...	2.15	2.15	3.00
cryst, bbls, c-l, wks 100 lb.	...	2.75	...	2.75	2.75	3.25
Monohydrate, bbls ... lb.	.	.023	...	.023	...	.023
Naphthenate, drs ... lb.	.12	.19	.09	.19	...	.09
Naphthionate, 300 lb bbl lb.	.52	.54	.52	.54	.52	.54
Nitrate, 92%, crude, 200 lb bgs, c-l, NY ... ton	...	28.30	26.80	28.30	24.80	26.80
100 lb bgs ... ton	...	29.00	27.50	29.00	25.50	27.50
Bulk ... ton	...	27.00	25.50	27.00	23.50	25.50

r Bone dry prices at Chicago 1c higher; Boston ½c; Pacific Coast 2c; Philadelphia deliveries f.o.b. N. Y.; refined 6c higher in each case; s T. N. and Superfine prices quoted f.o.b. N. Y. and Boston; Chicago prices 1c higher; Pacific Coast 3c; Philadelphia f.o.b. N. Y. * Spot price is ⅛c higher; † Closing prices Sept. 24th.

Current

Sodium Nitrite
Terpineol

	Current Market		1937 Low	1937 High	1936 Low	1936 High
Sodium (continued):						
Nitrite, 500 lb bbls .....lb.	.07	.10	.07	.10	.07	.08
Orthochlorotoluene, sulfonate, 175 lb bbls, wks..lb.	.25	.27	.25	.27	.25	.27
Perborate, drs, 400 lbs..lb.	.14¾	.15¼	.14¾	.15¼	.14¾	.18
Peroxide, bbls, 400 lb...lb.	...	.17	...	.17	...	.17
Phosphate, di-sodium, tech, 310 lb bbls, wks 100 lb.	...	1.90	...	1.90	1.95	2.30
bgs, wks ....100 lb.	...	1.70	...	1.70	1.75	2.10
Tri-sodium, tech, 325 lb bbls, wks ....100 lb.	...	2.05	...	2.05	1.95	2.30
bgs, wks ....100 lb.	...	1.85	...	1.85	1.75	2.10
Picramate, 160 lb kgs ...lb.	.65	.67	.65	.67	.65	.69
Prussiate, Yellow, 350 lb bbl, wks ....lb.	.10	.11½	.10	.11½	.10	.12
Pyrophosphate, anhyd, 100 lb bbls ....lb.	...	.10	...	.10	.10	.132
Sesquisilicate, drs, c-l, wks ....100 lbs.	...	3.00	...	...	...	...
Silicate, 60°, 55 gal drs, wks ....100 lb.	1.65	1.70	1.65	1.70	1.65	1.70
40°, 35 gal drs, wks 100 lb.	...	.80	...	.80	...	.80
tks, wks ....100 lb.	...	.65	...	.65	...	.65
Silicofluoride, 450 lb bbls NY ....lb.	.05¾	.06½	.05¾	.07	.05¼	.07¼
Stannate, 100 lb drs ....lb.	.32	.35	.32	.44	.28½	.37½
Stearate, bbls ....lb.	...	.24	.19	.24	.20	.26
Sulfanilate, 400 lb bbls..lb.	.16	.18	.16	.18	.16	.18
Sulfate Anhyd, 550 lb bgs* c-l, wks ....100 lb. ‡	1.45	1.90	1.45	1.90	1.30	1.90
Sulfide, 80% cryst, 440 lb bbls, wks ....lb.	...	.02¼	...	.02¼	...	.02¼
62% solid, 650 lb drs, c-l, wks ....lb.	...	.02	...	.02	...	.03
Sulfite, cryst, 400 lb bbls, wks ....lb.	.023	.02½	.023	.02½	.023	.02½
Sulfocyanide, drs ......lb.	.28	.47	.28	.47	.28	.47
Sulforicinoleate, bbls ...lb.	...	.12	...	.12	...	...
Tungstate, tech, crys, kgs lb.	...	nom.	.85	.90	.85	.90
Sorbitol, com., drs, basis content, wks ....lb.	...	.25	...	.25	...	
Spruce Extract, ord, tks...lb.	...	.01⅛	.01	.01⅛	...	.01
Ordinary, bbls ....lb.	...	.01⅝	.01½	.01⅝	...	.01½
Super spruce ext, tks...lb.	...	.01⅜	.01⅜	.01⅝	...	.01⅝
Super spruce ext, bbls ..lb.	...	.01⅞	...	.01⅞	...	.01⅞
Super spruce ext, powd, bgs ....lb.	...	.04	.04	.04¼	...	.04
Starch, Pearl, 140 lb bgs 100 lb.	3.48	3.68	3.48	4.53	2.99	4.30
Powd, 140 lb bgs ...100 lb.	3.58	3.78	3.58	4.63	3.90	4.54
Potato, 200 lb bgs .....lb.		.05½	.04½	.05½	.04½	.05½
Imp, bgs ....lb.	.05½	.06	.05	.06	.05	.06
Rice, 200 lb bbls ......lb.	...	.07¼	...	.07¼	...	.07¼
Wheat, thick, bgs ......lb.	.07	.08½	.07	.08½	.08¼	.08½
Strontium carbonate, 600 lb bbls, wks ....lb.	.07¼	.07½	.07¼	.07½	.07¼	.07½
Nitrate, 600 lb bbls, NY lb.	.07¾	.08¾	.07¾	.08¾	.08¾	.09½
Sucrose octa-acetate, den, grd, bbls, wks ....lb.	.45	...	.45	...	.45	...
tech, bbls, wks ....lb.	.40	...	.40	...	.40	...
Sulfur, crude, f.o.b. mines. ton	18.00	19.00	18.00	19.00	18.00	19.00
Flour, coml, bgs ....100 lb.	1.65	2.35	1.65	2.35	1.60	2.35
bbls ....100 lb.	1.95	2.70	1.95	2.70	1.95	2.70
Rubbermakers, bgs ..100 lb.	2.20	2.80	2.20	2.80	2.20	2.80
bbls ....100 lb.	2.55	3.15	2.55	3.15	2.55	3.15
Extra fine, bgs .....100 lb.	2.85	3.00	2.85	3.00	2.40	3.00
Superfine, bgs ......100 lb.	2.65	2.80	2.65	2.80	2.20	2.80
bbls ....100 lb.	2.25	3.10	2.25	3.10	2.25	3.10
Flowers, bgs ....100 lb.	3.00	3.75	3.00	3.75	3.00	3.75
bbls ....100 lb.	3.35	4.10	3.35	4.10	3.35	4.10
Roll, bgs ....100 lb.	2.35	3.10	2.35	3.10	2.35	3.10
bbls ....100 lb.	2.50	3.25	2.50	3.25	2.50	3.25
Sulfur Chloride, 700 lb drs, wks ....lb.	.03	.04	.02½	.04	...	...
Sulfur Dioxide, 150 lb cyl lb.	.07	.09	.07	.09	.06½	.08½
Multiple units, wks ....lb.	.04½	.07	.04½	.07	.05½	.06
tks, wks ....lb.	.04	.05	.04	.05	.04½	.04¾
Refrigeration, cyl, wks ..lb.	.16	.17	.15	.17	.10	.13
Multiple units, wks ....lb.	.07½	.10	.07½	.10	.07	.09¼
Sulfuryl Chloride ....lb.	.15	.40	.15	.40	.15	.40
Sumac, Italian, grd ......ton		61.00	58.50	65.00	52.00	60.00
Extract, 42°, bbls ......lb.	.05¼	.06¼	.05¼	.06¼	...	...
Superphosphate, 16% bulk, wks ....ton	...	9.00	8.25	9.00	...	...
Run of pile ....ton	...	8.50	8.00	8.50	...	...
Triple, 44-45%, a. p. a. bulk, wks, Balt. unit ......ton	...	.85	.70	.85	...	...
Talc, Crude, 100 lb bgs, NY ton	13.00	15.00	13.00	15.00	13.00	15.00
Ref'd, 100 lb bgs, NY ton	14.00	16.00	14.00	16.00	14.00	18.00
French, 220 lb bgs, NY ton	23.00	30.00	23.00	30.00	22.00	30.00
Ref'd, white, bgs, NY ton	45.00	60.00	45.00	60.00	45.00	60.00
Italian, 220 lb bgs to arr ton	60.00	62.00	60.00	62.00	60.00	75.00
Ref'd, white, bgs, NY ton	65.00	70.00	65.00	70.00	65.00	80.00
Tankage Grd, NY .....unit ¤	...	3.20	3.20	4.40	2.65	4.25
Ungrd ....unit ¤	...	3.10	3.10	4.35	2.40	4.25
Fert grade, f.o.b. Chgo unit ¤	...	3.00	3.00	4.00	2.40	4.00
South American cif unit ¤	...	3.15	3.15	4.25	2.70	3.90
Tapioca Flour, high grade, bgs ....lb.	.03¼	.05½	.03¼	.05½	.03½	.05½
Tar Acid Oil, 15%, drs ..gal.	.22½	.25½	.21	.25½	.21	.24
25%, drs ....gal.	.26½	.29½	.24½	.29½	.24	.27½
Tar, pine, delv, drs .....gal.	...	.26	...	.26	.25	.26
tks, delv, E. cities ....gal.	...	.20	...	.20	...	.20
Tartar Emetic, tech, bbls..lb.	.26¾	.27	.24¾	.27	.24¾	.25
USP, bbls ....lb.	.32	.32½	.30	.32½	.28	.30½
Terpineol, den grd, drs ...lb.	.13¾	.14¾	.13¾	.14¾	.13¾	.14¾
tks ....lb.	.13	.14	.13	.14	.13	.14

‡ Bags 15c lower; ¤ + 10; * Bbls. are 20c higher.

Prices

	Current Market		1937 Low	1937 High	1936 Low	1936 High
Tetrachlorethane, 650 lb drs lb.	.08	.08½	.08	.08½	.08	.08½
Tetrachloroethylene, drs, tech lb.	...	.10½	...	.10½	...	...
Tetralene, 50 gal drs, wks lb.	.12	.13	.12	.13	.12	.13
Thiocarbanilid, 170 lb bbl lb.	.20	.25	.20	.25	.20	.25
Tin, crystals, 500 lb bbls, wks lb.	.37	.37½	.37	.46	.35	.39½
Metal, NY lb.	...	.48⅜	.48⅜	.66	.40½	.52½
Oxide, 300 lb bbls, wks lb.	.54	.56	.54	.62	.47	.57
Tetrachloride, 100 lb drs, wks lb.	...	.24½	.24½	.32	.21¼	.26¾
Titanium Dioxide, 300 lb bbls lb.	.16¼	.17	.16¼	.17	.16¼	.19¼
Barium Pigment, bbls lb.	.06⅛	.06⅜	.06	.06⅜	.05¾	.06½
Calcium Pigment, bbls lb.	.06⅛	.06⅜	.06	.06⅜	.05¾	.06½
Toluidine, mixed, 900 lb drs, wks lb.	.26	.27	.26	.27	.27	.28
Toluol, 110 gal drs, wks gal.	...	.35	...	.35	.	.35
8000 gal tks, frt allowed gal.	...	.30	.	.30		.30
Toner Lithol, red, bbls lb.	.75	.80	.75	.80	.75	.80
Para, red, bbls lb.	...	.75	.	.75		.75
Toluidine, bgs lb.	...	1.35	...	1.35		1.35
Triacetin, 50 gal drs, wks lb.	...	.36	...	.36	.32	.36
Triamyl Borate, lcl, drs, wks lb.	.	.27	.	.27	.	
Triamylamine, c-l, drs, wks lb.	.77	1.25	.77	1.25	...	1.25
Tributylamine, lcl, drs, wks lb.	...	.70	...	.	...	...
Tributyl citrate, drs, frt all'd lb.	...	.45	...	.45	...	.
Tributyl Phosphate, frt all'd lb.	...	.50	...	.50	..	
Trichlorethylene, 600 lb drs, frt allowed E. Rocky Mts lb.	.089	.094	.089	.094	.089	.094
Tricresyl phosphate, tech, drs lb.	...	.26½	.22½	.26½	.19	.26
Triethanolamine, 50 gal drs wks lb.	.21	.22	.21	.30	.26	.30
tks, wks lb.	...	.20	.20	.25	.	.25
Triethylene glycol, drs, wks lb.	...	.26	.			
Trihydroxyethylamine Oleate, bbls lb.	...	.30	...	...	...	.
Stearate, bbls lb.	...	.30	...	...	...	.
Trimethylamine, c-l, drs, frt allowed E. Mississippi lb.	.	1.00	...	1.00		
Triphenylguanidine lb.	.58	.60	.58	.60	.58	.60
Triphenyl Phosphate, drs lb.	.34	.36	.			
Tripoli, airfloated, bgs, wks ton	25.00	30.00	25.00	30.00	27.50	30.00
Turpentine (Spirits), c-l, NY dock, bbls gal.	...	.32	.32	.47	.40½	.50
Savannah, bbls gal.	...	.26½	.25	.42	.35½	.45
Jacksonville, bbls gal.	...	.26½	.25	.41	.35¼	.44½
Wood Steam dist, bbls, c-l, NY gal.	...	.32	.34	.44	.38	.47
Wood, dest dist, c-l, drs gal.	...	.36	.	.	.	...
Urea, pure, 112 lb cases lb.	.14½	.15½	.14½	.15½	.14½	.17
Fert grade, bgs, c.i.f. ton						
c.i.f. S.A. points ton	95.00	110.00	95.00	110.00	95.00	110.00
Dom, f.o.b., wks ton	95.00	101.00	95.00	101.00	95.00	110.00
Urea Ammonia liq 55% NH_3, tks unit	No prices		1.00	1.04	.	.96
Valonia beard, 42%, tannin bgs ton	...	52.00	35.00	52.00	46.00	64.50
Cups, 32% tannin, bgs ton	...	35.00	31.50	36.00	34.00	42.00
Vanilin, ex eugenol, 25 lb tins, 2000 lb lots lb.	...	3.10	3.10	3.65	3.65	3.75
Ex-guaiacol lb.	...	3.00	3.00	3.55	3.55	3.65
Vermillion, English, kgs lb.	1.65	1.74	1.65	1.90	1.52	1.85
Wattle Bark, bgs ton	41.75	43.75	31.00	43.75	26.50	32.00
Extract, 60°, tks, bbls lb.	...	.04⅝	.03⅝	.04⅝	...	.03⅝
WAXES						
Wax, Bayberry, bgs lb.	.16⅞	.17	.16½	.17½	.16½	.20
Bees, bleached, white 500 lb slabs, cases lb.	.39	.45	.38	.45	.34	.40
Yellow, African, bgs lb.	.26	.26½	.26	.30	.24	.27
Brazilian, bgs lb.	.29½	.30	.29½	.34	.25	.29½
Chilean, bgs lb.	.29½	.30	.29½	.34	.25	.29½
Refined, 500 lb slabs, cases lb.	.35	.39	.29½	.39	.28	.32
Candelilla, bgs lb.	.15	.17	.13	.16½	.14	.17½
Carnauba, No. 1, yellow, bgs lb.	.44½	.46½	.44½	.49	.43½	.48
No. 2, yellow, bgs lb.	.43½	.44½	.43½	.46½	.42	.46
No. 2, N. C., bgs lb.	.39	.40	.38	.43	.38	.40
No. 3, Chalky, bgs lb.	.35	.37	.34½	.40	.33½	.38
No. 3, N. C., bgs lb.	.35	.37	.35	.43	.34	.41
Ceresin, dom, bgs lb.	.08½	.12	.08	.12	.08	.11
Japan, 224 lb cases lb.	.10¾	.11	.09½	.11¼	.08	.10½
Montan, crude, bgs lb.	.11	.12	.11	.12	.10¼	.11¼
Paraffin, see Paraffin Wax.						
Spermaceti, blocks, cases lb.	.23	.24	.23	.24	.22	.24
Cakes, cases lb.	.24	.25	.24	.25	.23	.25
Whiting, chalk, com, 200 lb bgs c-l, wks ton	12.00	14.00	12.00	14.00	...	15.00
Gilders, bgs, c-l, wks ton	..	15.00	...	15.00	11.50	15.00
Wood Flour, c-l, bgs ton	20.00	30.00	18.00	30.00	18.00	30.00
Xylol, frt allowed, East 10° tks, wks gal.	...	.33	...	.33	...	.33
Coml, tks, wks, frt all'd gal.	...	.30	...	.30	...	.30
Xylidine, mixed crude, drs lb.	.35	.36	.35	.36	.36	.37
Zinc, Carbonate tech, bbls, NY lb.	.14	.15	.12	.15	.09	.11
Chloride fused, 600 lb drs, wks lb.	.04½	.046	.04½	.046	.04½	.05¾
Gran, 500 lb drs, wks lb.	.05	.05¾	.05	.05¾	.05	.05¾
Soln 50%, tks, wks 100 lb.	...	2.25	2.00	2.25	...	2.00
Cyanide, 100 lb drs lb.	.36	.38	.36	.38	.36	.38
Zinc dust, 500 lb bbls, c-l, delv lb.	...	.0765	.0765	.094	.068	.0755
Metal, high grade slabs, c-l, NY 100 lb.	...	6.10	6.10	7.85	...	5.825
E. St. Louis 100 lb.	...	5.75	5.75	7.50	4.80	5.45
Oxide, Amer, bgs, wks lb.	.06¼	.07¾	.05¼	.07¾	.05	.05½
French, 300 lb bbls, wks lb.	.06¼	.07¾	.05½	.07¾	.05½	.07
Palmitate, bbls lb.	.23	.25	.23	.25	.22	.23
Resinate, fused, pale, bbls lb.	...	.10	.09	.10	.05¾	.10
Stearate, 50 lb bbls lb.	.20	.23	.20	.23	.19	.23

Current

Zinc Sulfate
Oil, Whale

		Current Market	1937 Low	1937 High	1936 Low	1936 High
Zinc Sulfate, crys, 400 lb bbl. wks	lb.	...	.033	.028	.033	.028	.033
Flake, bbls	lb.	...	.0375	.032	.0375	.032	.035
Sulfide, 500 lb bbls, delv	lb.	.09¼	.09¾	.09¼	.09¾	.09¼	.11¾
bgs, delv	lb.	.09	.09½	.09	.09½	.09	.11½
Sulfocarbolate, 100 lb kgs	lb.	.24	.26	.24	.26	.24	.25
Zirconium Oxide, crude, 73-75% grd, bbls, wks	ton	75.00	100.00	...	...	...	...
kgs, wks	lb.	.04¼	.04½	...	...	...	...

Oils and Fats

Babassu, tks, futures	lb.	.07½	.07¾	.07½	.11¼	...	...
Castor, No. 3, 400 lb bbls	lb.	.10¼	.10¾	.10¼	.10¾	.10¼	.10¾
Blown, 400 lb bbls	lb.	.12¼	.13	.12¼	.13	.12¼	.13
China Wood, drs, spot NY	lb.	.18	nom.	.12½	.23	.13	.19¼
Tks, spot NY	lb.	.18	nom.	.118	.23	.125	.19
Coast, tks	lb.	.18	nom.	.133	.23	.127	.18
Coconut, edible, bbls NY	lb.	.10½	.11	.10	.15	.09¼	.14¼
Manila, tks, NY	lb.	...	.04½	.04½	.09½	.04⅛	.07
Tks, Pacific Coast	lb.	...	.04⅜	.04¼	.08⅞	.03⅞	.08½
Cod, Newfoundland, 50 gal bbls	gal.	.52	nom.	.51	.52	.40	.48½
Copra, bgs, NY	lb.	...	.0260	.0260	.055	.0320	.0535
Corn, crude, tks, mills	lb.	...	.07	.06¾	.10¾	.08	.10½
Refd, 375 lb bbls, NY	lb.	.09¾	.10	.09¾	.13¼	.10¾	.13
Degras, American, 50 gal bbls, NY	lb.	.08	.08¼	.07¾	.08¼	.05¼	.08
English, bbls, NY	lb.	.08	.08¼	.07¾	.08¼	.04	.08
Greases, Yellow	lb.	.05⅛	.05¼	.05⅛	.09	.03⅜	.08¼
White, choice bbls, NY	lb.	.06¾	.07½	.06¾	.10¼	.04⅛	.08¾
Herring, Coast, tks	gal.	...	nom.	...	nom.	.	.31
Lard Oil, edible, prime	lb.	...	.15	.14¾	.16¾	.12¾	.16¼
Extra, bbls	lb.	...	.11¾	.11¾	.13½	.09½	.13
Extra, No. 1, bbls	lb.	...	.10½	.10½	.13½	.07¾	.12¼
Linseed, Raw less than 5 bbl lots	lb.	...	.118	.107	.121	.104	.117
bbls, c-l, spot	lb.	...	.11	.099	.113	.096	.103
Tks	lb.	...	.104	.093	.107	.086	.097
Menhaden, tks, Baltimore	gal.	.35	nom.	.35	.45	.25	.36
Refined, alkali, drs	lb.	...	.08	.08	.10	.066	.084
Tks	lb.	...	.074	.074	.09	.062	.078
Kettle bodied, drs	lb.	...	.09	.09	.11	.08	.096
Light pressed, drs	lb.	...	.074	.074	.094	.06	.078
Tks	lb.	...	.067	.067	.084	.056	.072
Neatsfoot, CT, 20°, bbls, NY	lb.	...	.16¾	.16¾	.18¼	.16	.17
Extra, bbls, NY	lb.	...	.10¾	.10¾	.13¾	.08	.12½
Pure, bbls, NY	lb.	...	.12¾	.12¾	.14¼	.11½	.12¾
Oiticica, bbls	lb.	.17	nom.	.10⅞	.17	.10	.15½
Oleo, No. 1, bbls, NY	lb.	...	.13	.12⅜	.14½	.09¼	.14
No. 2, bbls, NY	lb.	...	.12¼	.11⅞	.14	.08¾	.13½
Olive, denat, bbls, NY	gal.	1.30	nom.	1.30	1.65	.73	1.60
Edible, bbls, NY	gal.	2.40	nom.	2.20	2.50	1.60	2.25
Foots, bbls, NY	lb.	.10¼	.10½	.10¼	.12½	.08	.10⅜
Palm, Kernel, bulk	lb.	...	.05	.04¾	.08⅛	.04¾	.083
Niger, cks	lb.	...	.04½	.04½	.07¼	.04	.06½
Sumatra, tks	lb.	...	.03⅞	.03⅞	.06½	.03¾	.06½
Peanut, crude, bbls, NY	lb.	.06½	nom.	.06¼	.10⅝	.08	.10½
Tks, f.o.b. mill	lb.	.06½	nom.	.06½	.10¼	.17¾	.10⅜
Refined, bbls, NY	lb.	.10½	nom.	.10½	.13½	.12	.13¼
Perilla, drs, NY	lb.	.13¼	.13½	.11	.13½	.07	.11¾
Tks, Coast	lb.	.12¾	.13	.105	.13	.066	.11¼
Pine, see Pine Oil, Chemical Section.							
Rapeseed, blown, bbls, NY	lb.	.14½	.14¾	.13	.14¾	.086	.13½
Denatured, drs, NY	gal.	.93	.94	.85	.97	.52	.85
Red, Distilled, bbls	lb.	.10⅜	.11⅜	.10⅜	.12⅝	.08⅝	.11⅝
Tks	lb.	.09½	.10½	.09½	.10¾	.07¾	.09¾
Salmon, Coast, 8000 gal tks	gal.	...	nom.		nom.	.31	.32½
Sardine, Pac Coast, tks	gal.	...	.35	.35	.55	.28	.47
Refined alkali, drs	lb.	...	.08	.08	.10	.066	.084
Tks	lb.	...	.074	.074	.09	.062	.078
Light pressed, drs	lb.	...	.074	.074	.094	.06	.078
Tks	lb.	...	.067	.067	.084	.056	.072
Sesame, yellow, dom	lb.	.10½	nom.	.10½	.13¼	.12¾	.14½
White, dos	lb.	.10½	nom.	.10½	.13¼	.12¾	.14½
Soy Bean, crude							
Dom, tks, f.o.b. mills	lb.	...	.07	.07	.10½	.07	.10½
Crude, drs, NY	lb.	.07½	.08	.07½	.11½	.076	.11½
Ref'd, drs, NY	lb.	.08½	.09	.08½	.12½	.081	.12½
Tks	lb.	...	.08	.08	.11½	.07½	.11½
Sperm, 38° CT, bleached, bbls NY	lb.	.10	.102	.096	.102	.094	.102
45° CT, bleached, bbls, NY	lb.	.093	.095	.089	.095	.087	.095
Stearic Acid, double pressed dist bgs	lb.	.11½	.12½	.11½	.13½	.08½	.12½
Double pressed saponified bgs	lb.	.11¾	.12¼	.11¾	.13¾	.09	.12¾
Triple pressed dist bgs	lb.	.14¼	.15¼	.14¼	.16½	.11¼	.15½
Stearine, Oleo, bbls	lb.	.09¼	.09½	.09¼	.11½	.07¼	.12¼
Tallow City, extra loose	lb.	...	.06⅝	.06⅝	.09¼	.04⅛	.08⅜
Edible, tierces	lb.	...	.07¾	.07¾	.10¼	.06¾	.09½
Acidless, tks, NY	lb.	...	.09¼	.09¼	.13	.07	.11¾
Turkey Red, single, bbls	lb.	.08	.08½	.08	.08½	.08	.08½
Double, bbls	lb.	.12½	.13	.12½	.13	.12½	.13½
Whale:							
Winter bleach, bbls, NY	lb.	.098	.10	.091	.111	.072	.087
Refined, net, bbls, NY	lb.	.094	.096	.087	.107	.068	.083

Index to Advertisers

"We"—Editorially Speaking

We hear a great deal about chemistry's contribution to the mileage of the tire, the life of rayon, the industrial uses of synthetic resins; but in staid old fashioned fields, chemicals are doing a lot of not less startling work. About six hundred billion gallons of water are used in the boilers in the nation's locomotives. Only a few years ago it was the practice to wash these boilers every two to eight hundred miles, now most operate between two thousand to six thousand miles between washings, and the life of the locomotive flue has been increased from eighty to two hundred and fifty thousand miles. All this by the use of the humble "water softener."

Rayon statistics being as they are, our idea of something not to get excited about is the effect of a boycott against Japan upon the silk stocking trade.

Modestly our Editorial Department thinks that in the "box" on page 505 is the most important pronouncement made since King John signed the Magna Charta in 1215.

Personally, "We" suspect they are taking in a little too much territory for we remember that since that time Martin Luther nailed a statement to a church door, Napoleon declared himself Emperor of France, and John Hancock and others signed a pretty well known Declaration in 1776. However, "We" will go along with them back to September 16, 1914 and admit the announcement on page 505 is the most important since this publication was established. And we are not forgetting the Kaiser's farewell to his people, Mussolini's apology to Haile Selassie, Mr. Justice Black's various and sundry oaths, or any single one of the seven "fireside chats."

If the prices of corn or cotton drop five per cent., Secretary of Agriculture Wallace rushes to the White House with some new crop control or market pegging proposal. If the workers in the Podunk Peanut Pickling plant vote for a "company union," Secretary of Labor Madame Perkins goes into a huddle with C.I.O. Lewis and demands "a labor law with more teeth." But when commodity and security prices tumble 30 per cent., the Secretary of Commerce Mr. What's-his-name?—well you know the chap we mean—he hands out a batch of statistics showing that if happy days are not here again it's nobody's fault but the businessman's.

Poetry is epidemic these days. Esse Ruth has purchased for purposes of suppression an epic entitled "By the Banks of Dear Old Lake Charles." The stirring phosphate ballad to the music of the good old Yale football song is a regular battle cry among the T. S. P. salesmen, and the competitors chorus, "Why Make Caustic So Pure—Who Cares?" dedicated to Harry Hooker rivals in popularity some of the pretty theme songs in George M. Cohan's "I'd Rather Be Right." But the latest hit is the delicate bit of free verse "Chooey Fooey," a rare gem from the pen of Milton Kutz:—

To J. A. C. from M. K.

Who's Chooey Fooey?
And why?
Why try
To explain a guy
Who shouldn't be
And yet has the trade up a tree?
Suckers all—
Just his gall.
That's the why
Of Chooey;
And still I say: Fooey!

"County Agent Theodore Frisbie announced today that triple superphosphates can be obtained by soil conservation co-operators by paying the freight from Sheffield, Ala."—news item in *Thomson* (Ga.) *Progress*. We'll bet the boys around the cracker barrel are kicking about that little item of freight.

Exhuming ancient quotations that have an apt application today is a sort of literary archaeological expedition "We" enjoy, and here is a thirty year treasure by James J. Hill, who built the Northwestern empire, dug out of the files of the *New York Herald* of 1907.

"The whole trouble is that capital has become frightened. There is nothing so timid as money. Look at about one-half the legislation pending in every State. It is all taxation in different guises. When a man has been successful and accumulated property, there is a disposition to get much, if not most, away from him under forms of law. Investors do not dare to put out their money under such conditions. When men with money see what all this hostile legislation promises to result in they say: 'I won't put up my money in such securities!' Capital is therefore driven to its hole."

Is it simply silly or typically significant that F. D. Roosevelt officially and with gusto set the Bonneville Dam in operation September 28, 1937; but that it will produce no commercial power until May 15, 1938?

Fifteen Years Ago

From our issues of November, 1922

Lou Neuberg, resident manager, Warner Chemical, Carteret, N. J., elected Committee-man-at-Large of Woodbridge, N. J.

John Morris Weiss and Dr. Charles R. Downs awarded Howard N. Potts Medal from Franklin Institute.

Bakelite Corp. increases capital from $3,100,000 to $5,100,000.

H. L. Derby, president, Kalbfleisch Corp., arrives in Buenos Aires.

Henry Wigglesworth, formerly director development, General Chemical, returns to U. S. after year abroad.

Dr. Jerome Alexander establishes as a consulting chemist at 50 E. 41 St., New York City.

Dr. M. C. Whitaker, U. S. Industrial Alcohol awarded Perkin Medal.

Elmer Bobst, Hoffmann-LaRoche, elected president, Druachem Club.

Barrett Co. takes over plant of National Aniline at Marcus Hook, Pa., for manufacture naphthalene.

Palmolive Co., Milwaukee, plans one story addition to its building to enlarge soap capacity.

Stauffer Chemical acquires 30 acres of land on Houston ship channel, near Pasadena, Texas.

D. H. Litter Co. succeeds Litter and Allen.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Caustic Soda, solid
Caustic Soda, flake
Chlorine, liquid
Epsom Salts
Hydrogen Peroxide
Sodium Hypochlorite Solution
Sodium Sulphide
Sodium Phosphate, mono
Sodium Phosphate, di-
Sodium Phosphate, tri-
Tetra Sodium Pyro Phosphate
Sulphur Chloride, yellow, red
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